ADVANCED GEOGRAPHY

TARR & McMURRY

CALIFORNIA STATE SERIES

THIS IS A

STATE TEXT BOOK

It is the duty of Pupils to assist the State by guarding and using this book with care, so that it may yield good service. Only one book can be given to a pupil. He should cover it with paper or other protective material. If he loses, damages, or destroys it, he should replace it at his own expense. It is the duty of Teachers to encourage and enforce these provisions.

SCHOOL DISTRICT,

in _____ County.

_____, 19__.

Date of issue.

OZ

Olive Wilkinson

SUPPLEMENT

HOW TO OPEN A NEW BOOK

HOLD the book with its back on a smooth or covered table; let the front board down, then the other, holding the leaves in one hand while you open a few leaves at the back, then a few at the front, and so on, alternately opening back and front, gently pressing open the sections till you reach the center of the volume. Do this two or three times and you will obtain the best results. Open the volume violently or carelessly in any one place and you will probably break the back and cause a start in the leaves. Never force the back of a book.

TO THE TEACHER.

Geography like history is daily being made and since the state textbooks in geography have not been brought up to date for a number of years, the State Board of Education feels that a brief supplement is needed to help the teachers in their work. In view of coming changes in world geography, a thorough revision is not wise or practicable at this time. Many geographical changes caused by war and the passage of time will occur within the next year or two.

Not until conditions are more settled is it likely that these or any other geography textbooks will be thoroughly reorganized. In the meantime, this little supplement may be of service to the teaching force of the state. The matter contained therein is taken largely from Tarr and McMurry's New Geographies.

The supplement will contain information under the following heads:

1. The Discovery of the North and the South Poles.
2. The Panama Canal and the Panama Canal Zone.
3. The Government of Portugal.
4. The Control of Korea.
5. The Government of China.
6. The Colonies of South Africa.
7. The New States of the Union.
8. Development in the Philippines.
9. The Development of the Oil Industry in the Western States.
10. The Development of the Rice Industry in California.
11. The Introduction of Portland Cement.
12. Reclamation in California.
13. Eruption of Mt. Lassen.
14. The Earthquake of 1906.
15. New Tables of Population.

Teachers should direct the pupils to mark their books at the places where the following statements or corrections apply.

The Discovery of the North and the South Poles.

P. 124, Introductory Geography.

Many men have tried to cross the icy seas that surround the north pole; but, until 1909, no one had been able to get quite as far as the pole. In that year, Commodore Peary, after many trials, at last reached the north pole.

On December 16, 1911, Roald Amundsen, in command of the Norwegian expedition in search of the south pole, made a camp at the exact pole, and placed there a cairn with the Norwegian flag. A month later Captain Scott, in command of the British expedition, found the cairn and Norwegian flag. Months later the bodies of Captain Scott and two others of the expedition were found where they had perished in a blizzard. A notebook which contributes an imperishable page to English literature told of the discovery and the hardships preceding and following it that ended in the death of Captain Scott and his comrades.

Panama Canal and Canal Zone.

P. 213, Introductory Geography.
PP. 18, 184, 214-218 in Advanced Geography.

Central America and the Isthmus of Panama are of interest because of the Panama Canal that has been completed recently. In 1904 a treaty was ratified between the Government of the United States and that of Panama by which the strip of land ten miles wide and fifty miles long, known as the Panama Canal Zone, was created and ceded to the United States. Work was begun under the new treaty in 1906, and on October 10, 1913, there occurred what is called the Union of the Atlantic and Pacific Waters by the blowing up of the Gamboa Dike.

The opening of the Panama Canal is of great importance in the commerce of the entire world. A steamer bound from London to San Francisco saves five thousand miles by taking the new route, while eight thousand miles are saved from New York to San Francisco. Examine the globe to see why more miles are saved in the latter case. The canal benefits not only our seacoast towns, but also many interior communities of our country by affording convenient and cheap transportation for their products. What effect will the canal have upon the size of the city of Panama at one end of the canal and of Colon at the other end?

The Panama-Pacific International Exposition at San Francisco in 1915 commemorated the opening of the canal.

The Government of Portugal.

P. 240, Introductory Geography.
P. 365, Advanced Geography.

Both Spain and Portugal have been limited monarchies, but in 1910 Portugal became a republic. Attempts to reinstate the monarchial form of government have persisted, and resulted during May, 1915, in considerable disturbance and rioting.

The Control of Korea.

P. 257, Introductory Geography.

Korea was an independent kingdom until a few years ago, when Japan seized it during her war with Russia. It is a very backward nation, and until recently, foreigners were not allowed to enter the country. The chief industry is agriculture, but there are extensive forests and valuable mineral deposits.

The Government of China.

P. 255, Introductory Geography.
P. 460, Advanced Geography.

Until 1912, the Chinese government was an absolute monarchy, with a governor, or viceroy, for each province, one of whose duties it was to collect money for the government. The Emperor was not a Chinaman, but belonged to the Manchu division of the yellow race, which invaded and conquered China in 1644. It was then that the Manchu custom of wearing a long queue was introduced into China. This form of government finally became so unpopular that the Chinese rose in rebellion and established a republican form of government. With this popular government great progress is taking place in China.

The Colonies of South Africa.

P. 269, Introductory Geography.

Much of South Africa was first claimed by the Dutch of Holland. The English, however, long ago got possession of Cape of Good Hope, and by war obtained the other Dutch countries of South Africa. They are now united under the name, The Union of South Africa.

The Cape to Cairo Route.

P. 270, Introductory Geography.

The boldest plan of all is to build a railway from Cape of Good Hope to Cairo in Egypt. It is called the "Cape to Cairo" route. Doubtless, one will in time be able to travel by rail all the way from Cape Town to the Mediterranean Sea.

New States of the Union.

P. 163, Advanced Geography.

When the Western Country was first settled, it was divided into territories, but as the population increased, these territories have one by one been admitted into the Union as states. The last to be admitted were Arizona and New Mexico in 1912.

There are many fertile valleys in these two states, where there is irrigation; and in this warm climate wheat, corn, vegetables, alfalfa, apples, peaches, grapes, and many other crops are raised. While some of the farming is carried on by Mexicans and Indians, best results are gained by Americans, who own a large part of the irrigated land. The United States government is spending large sums of money in building storage reservoirs, and in improving the irrigation systems in other ways, so that many settlers are finding valuable farm lands here.

Development in the Philippines.

P. 276, Introductory Geography.
P. 188, Advanced Geography.

The inhabitants of the Philippines number nearly eight million, about six-sevenths of whom are civilized. Besides the Negritos, the various tribes of Malays, and the half-breeds, many Chinese traders and Spaniards live on the islands; and now there are many Americans.

The United States Government is inclined to promote Philippine independence as rapidly as the safety and permanent interests of the islands will permit. As a pledge of good faith, the Governmental Commission, consisting of the Governor-General and eight associates, at first entirely Americans, has now a majority of native members. The administrative offices are gradually being relinquished to the natives of the islands. The advance in public health, sanitation, education, and financial independence has been marked in recent years.

The Development of the Oil Industry in the Western States.

P. 79, Advanced Geography.

Formerly no region in the world produced so much oil as Western Pennsylvania, West Virginia, and Eastern Ohio; but now this region is rivaled by California and a part of the Gulf region in Texas and Louisiana.

Mineral Products in the Western States.

P. 155, Advanced Geography.

Coal, Petroleum, and Other Materials.

Coal, some of it of excellent quality, is found in many sections, being mined in almost all the Western States, but the greatest amount comes from Colorado. In coal production, Colorado ranks seventh among the states of the country. Among Western States, Wyoming and Washington are next in coal production. Nearly every one of the Western States has coal beds, which are bound to be of great value in the future.

Petroleum is another valuable product in the West. Enormous quantities have been found in California, and that state now produces more than any other state in the Union. So much is produced, in fact, that it is used on railway engines in place of coal.

There are many other mineral products in the Western States, including building and semi-precious stones, which are obtained in California, Arizona, Colorado, Utah, Nevada, and other states.

P. 195, Introductory Geography.
P. 154, Advanced Geography.

Discovery of remarkable new mining fields in Nevada has made it first in the production of silver. At present Colorado produces more gold than any other state and ranks fourth in the production of silver. Arizona now ranks first among the states of the Union in the production of copper. California ranks second among our states in the production of gold, Utah third in silver and lead, and Idaho second in lead and fifth in silver. The mines of Montana are very extensive, and the state is now second in the production of silver and copper.

The Development of the Rice Industry in California.

Insert on Page 161, Advanced Geography.

In 1909 the Department of Agriculture made experimental plantings of rice in the vicinity of Biggs, Butte County. From that time, the rice area has increased at a surprising rate, and rice is fast becoming one of the principal crops of the interior valleys of California. The future of the rice industry seems bright, and a large increase in the acreage seems assured.

The Introduction of Portland Cement.

P. 83, Advanced Geography.

Portland cement has become of great importance within the last few years. It is made in many places in the East, especially in New Jersey, Pennsylvania and New York, in the West, especially in Colorado and California. To make it, limestone is ground fine and mixed with coal dust, clay containing silica, and other pulverized minerals. This mixture is placed in a furnace, where the burning coal dust gives out so much heat that the mixture melts. It comes out of the furnace as a kind of clinker, which is then ground into fine powder for use. This cement has the valuable property of becoming hard like rock, or *setting*, when water is added. It is used for sidewalks, for buildings, dams, bridges, and many other structures, taking the place of wood, stone and iron.

Reclamation in California.

Adapted from the report of the California Reclamation Board.

Page 570, Advanced Geography. (Great Valley Region.)

The importance of this project of controlling the floods in the great river valleys of California is being realized by the work of the California Reclamation Board.

There are 1,726,553 acres of land in the Sacramento and San Joaquin Drainage District subject to overflow. About 500,000 acres are now either partly or completely reclaimed. Plans have been made to reclaim an additional 250,000 acres, and the work has been started. There are still about 1,000,000 acres unreclaimed, with no plans in sight, and no plans practicable, unless a flood control project of considerable proportions can be carried through. The consideration of this project is occupying the attention of many interested in the future of these flooded lands, and indirectly in the increase in wealth and population of the state.

Of the 1,000,000 acres now lost to reclamation which can be reclaimed if the project is carried out, most of the land has at present nothing but a nominal and speculative value. Some is held at from $15 to $40 per acre, because of the opportunity for summer cropping. All of this land permanently reclaimed would be worth $250 per acre, and the cost of reclamation and project assessment would vary from $75 to $150. There would be added immediately to the wealth of the state, in increased value of this land for assessment, as well as productive purposes, at least $200 per acre, or $200,000,000.

This land reclaimed would be capable of intensive cultivation and the growing of valuable crops. It would rent for from $15 to $35 per acre per year, and its products would be worth from $40 to $200 per acre. At a low average figure the 1,000,000 acres would produce eventually $60,000,000 per year—and with the advantages offered by the Panama canal in markets it probably would not be many years until the entire acreage would be producing at this rate.

In population the results would be equally marked. Under continuance of existing conditions this 1,000,000 acres will never support any population. The 750,000 acres will support but a small number of homes, because of danger from floods. After completion of the flood control project the entire district will rapidly fill with fine homes, and in time support millions of desirable citizens, living in comfort and luxury from the products of the soil and from the business enterprises created by such activities.

Activity of Mt. Lassen.

Pp. 6 and 624, Advanced Geography.

Mt. Lassen, in Shasta County, has long been regarded as an extinct volcano, similar to Mt. Shasta, Mt. Hood, and the other snowy peaks of the Cascade Range. From them in ages past have come the vast lava flows and blankets of ashes, tuffs and pumice that have built up the volcanic plains and table-lands and hills of Northern California and Oregon. Indeed, Lassen has been active within a hundred years, as pine trees, partly burned by lava, are still found at Cinder Cone, near by.

In May, 1914, the mountain again resumed activity. For a year now it has been sending up clouds of steam, smoke and volcanic dust, with an occasional explosion from the summit that shoots up showers of red hot rocks as well as tall towers of dust and vapor. Some of the high meadows on the flanks of the mountain, particularly along Hat

Creek and Lost Creek, have been covered deep with a white mud, formed by the ejected materials mixed with melted snow. This flood sweeps down with such force that it uproots great trees and tears them to pieces and covers the mountain meadows sometimes twenty feet deep. This debris soon hardens so that horses and wagons pass over it, above houses and barns and haystacks and trees, as on a cement pavement.

It is of interest to know that the only active volcano in the United States is in California. It is so accessible that one may drive his automobile within three or four miles of the smoking summit and make his chilly camp by a mountain lake, with the volcanic exhibition fully spread out before his eyes. No one knows what the future may bring forth.

The Earthquake of 1906.

P. 624, Advanced Geography.

The great earthquake which occurred in 1906 followed the axis of an ancient fault, the Portola-Tomales fault, or San Andreas fault. The course of this fault is in almost a straight line from Point Arena in Mendocino County to Chittenden in Monterey County, a distance of 192 miles.

Buildings were destroyed in great numbers within the area of disturbance. Stanford University suffered great loss. The city of Santa Rosa also was particularly unfortunate in experiencing a very heavy shock.

But it was fire, not earthquake, that destroyed San Francisco. So soon, however, did the city rise from the ashes that it is often called the Phœnix City. San Francisco stands today the fulfillment of the prophecy made at the time, that for every man who leaves in fear, there will return ten men who will love the land where nature is so gracious, man so free-limbed, and where the very stones are alive with the forces of creation.

P. 66, Advanced Geography. (Last two lines.)

Read "The working day is eight hours long."

P. 549-550, Advanced Geography.

Omit second half of page 549 and all of page 550, because the material cited for reference is out of print.

As a substitute for these references, a copy of the last report of the California Development Board will be sent to every teacher of the grammar grades.

TABLES OF POPULATION.

The following tables of population are those from the census of 1910, and are to take the place of similar tables in the appendix of both the Introductory and the Advanced Geographies.

States and Territories of the United States.

	Population 1910		Population 1910
Alabama	2,138,093	Nevada	81,875
Alaska	64,356	New Hampshire	430,572
Arizona	204,354	New Jersey	2,537,167
Arkansas	1,574,449	New Mexico	327,301
California	2,377,549	New York	9,113,614
Colorado	799,024	North Carolina	2,206,287
Connecticut	1,114,756	North Dakota	557,056
Delaware	202,322	Ohio	4,767,121
District of Columbia	331,069	Oklahoma	1,657,155
Florida	752,619	Oregon	672,765
Georgia	2,609,121	Pennsylvania	7,665,111
Guam	11,973	Philippine Islands	8,276,802
Hawaiian Islands	191,909	Porto Rico	1,118,012
Idaho	325,594	Rhode Island	542,610
Illinois	5,638,591	South Carolina	1,515,400
Indiana	2,700,876	South Dakota	583,888
Iowa	2,224,771	Tennessee	2,184,789
Kansas	1,690,949	Texas	3,896,542
Kentucky	2,289,905	Tutuila	6,780
Louisiana	1,656,388	Utah	373,351
Maine	742,371	Vermont	355,956
Maryland	1,295,346	Virginia	2,061,612
Massachusetts	3,366,416	Washington	1,141,990
Michigan	2,810,173	West Virginia	1,221,119
Minnesota	2,075,708	Wisconsin	2,333,860
Mississippi	1,797,114	Wyoming	145,965
Missouri	3,293,335	United States, total	93,402,151
Montana	376,053	United States (without Alaska, Phil. Is., etc.)	91,972,266
Nebraska	1,192,214		

Twenty-five of the Largest Cities in the World.

	Population		Population
1. London, England, 1910	4,872,702	13. Calcutta, India, 1910	1,216,514
Greater London, 1910	7,537,196	14. Constantinople, Turkey	1,125,000
2. New York, U. S., 1910	4,766,883	15. Osaka, Japan, 1908	1,117,151
3. Paris, France, 1911	2,846,986	16. Shanghai, China	1,000,000
4. Tokyo, Japan, 1909	2,168,069	17. Tientsin, China, 1910	1,000,000
5. Chicago, U. S., 1910	2,185,283	18. Rio de Janeiro, Brazil, 1909	1,000,000
6. Berlin, Germany, 1910	2,070,695	19. Bombay, India, 1910	972,892
7. Vienna, Aus.-Hun., 1911	2,004,291	20. Hamburg, Germany, 1910	936,000
8. Petrograd, Russia, 1910	1,907,708	21. Liverpool, England, 1910	767,606
9. Canton, China	1,600,000	22. Glasgow, Scotland, 1909	872,021
10. Philadelphia, U. S., 1910	1,549,008	23. Warsaw, Russia, 1901	756,426
11. Moscow, Russia, 1907	1,359,254	24. Budapest, Aus.-Hun., 1901	732,322
12. Buenos Aires, Argen., 1911	1,826,994	25. Barcelona, Spain, 1911	700,000

Twenty-five Largest Cities in the United States.

	Population 1910		Population 1910
1. New York, N. Y.	4,766,883	14. Newark, N. J.	347,469
2. Chicago, Ill.	2,185,283	15. New Orleans, La.	339,075
3. Philadelphia, Pa.	1,549,008	16. Washington, D. C.	331,069
4. St. Louis, Mo.	687,029	17. Los Angeles, Cal.	319,198
5. Boston, Mass.	670,585	18. Minneapolis, Minn.	301,408
6. Cleveland, Ohio	560,663	19. Jersey City, N. J.	267,779
7. Baltimore, Md.	558,485	20. Kansas City, Mo.	248,331
8. Pittsburgh, Pa.	533,905	21. Seattle, Wash.	237,194
9. Detroit, Mich.	465,766	22. Indianapolis, Ind.	233,650
10. Buffalo, N. Y.	423,715	23. Providence, R. I.	224,326
11. San Francisco, Cal.	416,912	24. Louisville, Ky.	223,928
12. Milwaukee, Wis.	373,857	25. Rochester, N. Y.	218,146
13. Cincinnati, Ohio	364,463		

Cities of the United States With 25,000 or More Inhabitants in 1910; and a Few Others, Mostly Mentioned in the Book.

	Population 1910		Population 1910
Akron, Ohio	69,067	Bellingham, Wash.	24,296
Albany, N. Y.	100,253	Berkeley, Cal.	40,434
Albuquerque, N. M.	11,020	Biddeford, Me.	17,079
Allentown, Pa.	51,913	Billings, Mont.	10,031
Altoona, Pa.	52,127	Binghampton, N. Y.	48,443
Amsterdam, N. Y.	31,267	Birmingham, Ala.	132,685
Anaconda, Mont.	10,134	Bisbee, Ariz.	9,019
Annapolis, Md.	8,609	Bismarck, N. D.	5,443
Ann Arbor, Mich.	14,817	Bloomington, Ill.	25,768
Asheville, N. C.	18,762	Boise, Idaho	17,358
Ashland, Wis.	11,594	Boston, Mass.	670,585
Astoria, Ore.	9,599	Bradford, Pa.	14,544
Atchison, Kan.	16,429	Bridgeport, Conn.	102,054
Atlanta, Ga.	154,839	Brockton, Mass.	56,878
Atlantic City, N. J.	46,150	Brookline, Mass.	27,792
Auburn, Me.	15,064	Brunswick, Ga.	10,182
Auburn, N. Y.	34,668	Buffalo, N. Y.	423,715
Augusta, Ga.	41,040	Burlington, Vt.	20,463
Augusta, Me.	13,211	Butte, Mont.	39,165
Aurora, Ill.	29,807	Cambridge, Mass.	104,839
Austin, Texas	29,860	Camden, N. J.	94,538
Baltimore, Md.	558,485	Canton, Ohio	50,217
Bangor, Me.	24,803	Carson City, Nev.	2,466
Barre, Vt.	10,734	Cedar Rapids, Iowa	32,811
Bath, Me.	9,396	Champaign, Ill.	12,421
Baton Rouge, La.	14,897	Charleston, S. C.	58,833
Battle Creek, Mich.	25,267	Charleston, W. Va.	22,996
Bay City, Mich.	45,166	Charlotte, N. C.	34,014
Bayonne, N. J.	55,545	Chattanooga, Tenn.	44,604

	Population 1910		Population 1910
Chelsea, Mass.	32,452	Galveston, Texas	36,981
Chester, Pa.	38,537	Gloucester, Mass.	24,398
Cheyenne, Wyo.	11,320	Goldfield, Nev.	4,838
Chicago, Ill.	2,185,283	Grand Rapids, Mich.	112,571
Chicopee, Mass.	25,401	Greeley, Colo.	8,179
Cincinnati, Ohio	364,463	Green Bay, Wis.	25,236
Clarksville, Tenn.	8,548	Greenville, S. C.	15,741
Cleveland, Ohio	560,663	Guthrie, Okla.	11,654
Clinton, Iowa	25,577	Hamilton, Ohio	35,279
Colorado Springs, Colo.	29,078	Harrisburg, Pa.	64,186
Columbia, S. C.	26,319	Hartford, Conn.	98,915
Columbus, Ga.	20,554	Haverhill, Mass.	44,115
Columbus, Ohio	181,548	Hazelton, Pa.	25,452
Concord, N. H.	21,497	Helena, Mont.	12,515
Council Bluffs, Iowa	29,292	High Point, N. C.	9,525
Covington, Ky.	53,270	Hilo, Hawaiian Islands	6,745
Cripple Creek, Colo.	6,206	Hoboken, N. J.	70,324
Dallas, Texas	92,104	Holyoke, Mass.	57,730
Danville, Ill.	27,871	Honolulu, Hawaiian Islands	52,183
Danville, Va.	19,020	Hot Springs, Ark.	14,434
Davenport, Iowa	43,028	Houghton, Mich.	5,113
Dayton, Ohio	116,577	Houston, Texas	78,800
Decatur, Ill.	31,140	Huntington, W. Va.	31,161
Denver, Colo.	213,381	Huntsville, Ala.	7,611
Des Moines, Iowa	86,368	Indianapolis, Ind.	233,650
Detroit, Mich.	465,766	Ishpeming, Mich.	12,448
Douglas, Ariz.	6,437	Ithaca, N. Y.	14,802
Dover, Del.	3,720	Jackson, Mich.	31,433
Dover, N. H.	13,247	Jackson, Miss.	21,262
Dubuque, Iowa	38,494	Jacksonville, Fla.	57,699
Duluth, Minn.	78,466	Jamestown, N. Y.	31,297
Durham, N. C.	18,241	Jefferson City, Mo.	11,850
Easton, Pa.	28,523	Jersey City, N. J.	267,779
East Orange, N. J.	34,371	Johnstown, Pa.	55,482
Eastport, Me.	4,961	Joliet, Ill.	34,670
East St. Louis, Ill.	58,547	Joplin, Mo.	32,073
Elgin, Ill.	25,976	Juneau, Alaska	1,644
Elizabeth, N. J.	73,409	Kalamazoo, Mich.	39,437
Elmira, N. Y.	37,176	Kansas City, Kan.	82,331
El Paso, Texas	39,279	Kansas City, Mo.	248,381
Erie, Pa.	66,525	Key West, Fla.	19,945
Evanston, Ill.	24,978	Kingston, N. Y.	25,908
Evansville, Ind.	69,647	Knoxville, Tenn.	36,346
Everett, Mass.	33,484	La Crosse, Wis.	30,417
Fall River, Mass.	119,295	Lancaster, Pa.	47,227
Fargo, N. D.	14,331	Lansing, Mich.	31,229
Findlay, Ohio	14,858	Laramie, Wyo.	8,237
Fitchburg, Mass.	37,826	Lawrence, Mass.	85,892
Flint, Mich.	38,550	Leadville, Colo.	7,508
Fort Wayne, Ind.	63,933	Lewiston, Idaho	6,043
Fort Worth, Texas	73,312	Lewiston, Me.	26,247
Frankfort, Ky.	10,465	Lexington, Ky.	35,099
Fresno, Cal.	24,892	Lima, Ohio	30,508

	Population 1910		Population 1910
Lincoln, Neb.	43,973	Olympia, Wash.	6,996
Little Rock, Ark.	45,941	Omaha, Neb.	124,096
Lockport, N. Y.	17,970	Orange, N. J.	29,630
Lorain, Ohio	28,833	Oshkosh, Wis.	33,062
Los Angeles, Cal.	319,198	Oswego, N. Y.	23,368
Louisville, Ky.	223,928	Pasadena, Cal.	30,291
Lowell, Mass.	106,294	Passaic, N. J.	54,773
Lynchburg, Va.	29,494	Paterson, N. J.	125,600
Lynn, Mass.	89,336	Pawtucket, R. I.	51,622
Macon, Ga.	40,665	Pensacola, Fla.	22,982
Madison, Wis.	25,531	Peoria, Ill.	66,950
Malden, Mass.	44,404	Perth Amboy, N. J.	32,121
Manchester, N. H.	70,063	Petersburg, Va.	24,147
Manila, Philippines	-------	Philadelphia, Pa.	1,549,008
Marquette, Mich.	11,503	Phoenix, Ariz.	11,134
McKeesport, Pa.	42,694	Pierre, S. D.	3,656
Memphis, Tenn.	131,105	Pittsburgh, Pa.	533,905
Meriden, Conn.	27,265	Pittsfield, Mass.	32,121
Miami, Fla.	5,471	Plymouth, Mass.	12,141
Milwaukee, Wis.	373,857	Pomona, Cal.	10,207
Minneapolis, Minn.	301,408	Ponce, Porto Rico	35,027
Mobile, Ala.	51,521	Portland, Me.	58,571
Montgomery, Ala.	38,136	Portland, Ore.	207,214
Montpelier, Vt.	7,856	Portsmouth, N. H.	11,269
Mount Vernon, N. Y.	30,919	Portsmouth, Va.	33,190
Muskogee, Okla.	25,278	Poughkeepsie, N. Y.	27,933
Nashua, N. H.	26,005	Prescott, Ariz.	5,092
Nashville, Tenn.	110,364	Providence, R. I.	224,326
Natchez, Miss.	11,791	Provincetown, Mass.	4,369
Newark, N. J.	347,469	Pueblo, Colo.	44,395
Newark, Ohio	25,404	Quincy, Ill.	36,587
New Bedford, Mass.	96,652	Quincy, Mass.	32,642
New Britain, Conn.	43,916	Racine, Wis.	38,002
Newburgh, N. Y.	27,805	Raleigh, N. C.	19,218
Newcastle, Pa.	36,280	Reading, Pa.	96,071
New Haven, Conn.	133,605	Redlands, Cal.	10,449
New Orleans, La.	339,075	Richmond, Va.	127,628
Newport, Ky.	30,309	Riverside, Cal.	15,212
Newport, R. I.	27,149	Roanoke, Va.	34,874
Newport News, Va.	20,205	Rochester, N. Y.	218,149
New Rochelle, N. Y.	28,867	Rockford, Ill.	45,401
Newton, Mass.	39,806	Rome, Ga.	12,099
New York, N. Y.	4,766,883	Rutland, Vt.	13,546
Niagara Falls, N. Y.	30,445	Sacramento, Cal.	44,696
Nome City, Alaska	2,600	Saginaw, Mich.	50,510
Norfolk, Va.	67,452	St. Augustine, Fla.	5,494
Norristown, Pa.	27,875	St. Joseph, Mo.	77,403
North Yakima, Wash.	14,082	St. Louis, Mo.	687,029
Oakland, Cal.	150,174	St. Paul, Minn.	214,744
Ogden, Utah	25,580	Salem, Mass.	43,697
Oil City, Pa.	15,657	Salem, Ore.	14,094
Oklahoma City, Okla.	64,205	Salt Lake City, Utah	92,777
Olean, N. Y.	14,743	San Antonio, Texas	96,614

	Population 1910		Population 1910
San Bernardino, Cal.	12,779	Taunton, Mass.	34,259
San Diego, Cal.	39,578	Terre Haute, Ind.	58,157
San Francisco, Cal.	416,912	Toledo, Ohio	168,497
San Jose, Cal.	28,946	Tonopah, Nev.	3,900
San Juan, Porto Rico	48,716	Topeka, Kan.	43,684
Santa Fe, N. M.	5,072	Trenton, N. J.	96,815
Sault Ste. Marie, Mich.	12,615	Troy, N. Y.	76,813
Savannah, Ga.	65,064	Tucson, Ariz.	13,193
Schenectady, N. Y.	72,826	Utica, N. Y.	74,419
Scranton, Pa.	129,867	Vicksburg, Miss.	20,814
Seattle, Wash.	237,194	Virginia City, Nev.	2,244
Shawnee, Okla.	12,474	Waco, Texas	26,425
Sheboygan, Wis.	26,398	Walla Walla, Wash.	19,363
Shenandoah, Pa.	25,774	Waltham, Mass.	27,834
Shreveport, La.	28,015	Warwick, R. I.	26,629
Sioux City, Iowa	47,828	Washington, D. C.	331,069
Sioux Falls, S. D.	14,094	Waterbury, Conn.	73,141
Sitka, Alaska	1,039	Waterloo, Iowa	26,693
Skagway, Alaska	872	Watertown, N. Y.	26,730
Somerville, Mass.	77,236	Waterville, Me.	11,458
South Bend, Ind.	53,684	West Hoboken, N. J.	35,403
South Omaha, Neb.	26,259	Wheeling, W. Va.	41,641
Spartanburg, S. C.	17,519	Wichita, Kan.	52,450
Spokane, Wash.	104,402	Wilkes-Barre, Pa.	67,105
Springfield, Ill.	51,678	Williamsport, Pa.	31,860
Springfield, Mass.	88,926	Wilmington, Del.	87,411
Springfield, Mo.	35,201	Wilmington, N. C.	25,748
Springfield, Ohio,	46,921	Winona, Minn.	18,583
Stamford, Conn.	25,138	Woonsocket, R. I.	38,125
Stockton, Cal.	23,253	Worcester, Mass.	145,986
Superior, Wis.	40,384	Yonkers, N. Y.	79,803
Syracuse, N. Y.	137,249	York, Pa.	44,750
Tacoma, Wash.	83,743	Youngstown, Ohio	79,066
Tallahassee, Fla.	5,018	Zanesville, Ohio	28,026
Tampa, Fla.	37,782		

The American's Creed

I BELIEVE in the UNITED STATES OF AMERICA as a government of the people, by the people, for the people; whose just powers are derived from the consent of the governed; a democracy in a republic; a sovereign nation of many sovereign states; a perfect union, one and inseparable; established upon those principles of Freedom, Equality, Justice, and Humanity for which American patriots sacrificed their lives and fortunes.

I THEREFORE believe it is my duty to my country to love it; to support its CONSTITUTION; to obey its laws; to respect its FLAG; and to defend it against all enemies.

AUTHORIZED VERSION.

FIG. A.
Yosemite Falls

Go forth under the open sky, and list
To Nature's teachings, while from all around —
Earth and her waters, and the depths of air, —
Comes a still voice — WILLIAM CULLEN BRY-

CALIFORNIA STATE SERIES

ADVANCED GEOGRAPHY

TARR AND McMURRY

REVISED BY
THE TEXT-BOOK COMMITTEE
AND APPROVED BY
THE STATE BOARD OF EDUCATION

A Native Son.
"Blessings on thee, little man, * * *"

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PREFACE

In the plan of this volume the authors have left the beaten track to such an extent that some words of explanation seem in place.

General Geography. — Probably the most difficult part of the geography for Grammar School grades is that dealing with seasons, winds, rainfall, temperature, etc. It ordinarily occupies a considerable number of pages at the beginning of the larger book, and follows immediately upon Primary Geography.

This arrangement requires pupils to spring from a meager study of simple, concrete facts to the highest abstractions in the entire subject; and, what makes the matter worse, these broad abstractions are usually only very briefly stated.

The authors of this volume have followed a different plan. Only three chapters, at the beginning of the book, precede the intensive treatment of the United States. The first is a physiographic history of the continent, showing how its principal mountain ranges and valleys came into existence; how its coal beds were formed; what were the effects of the great Ice Age; and what have been the more recent changes in the coast line, with their results. Then comes a chapter on the Plants, Animals, and Peoples of North America; and following that is a treatment of Latitude and Longitude.

Only so much is presented before taking up the United States, because that is all that seems really necessary. Whatever further facts have been needed for North America in regard to seasonal changes, winds, etc., have been plainly stated, when needed, just as other concrete facts have been. After our continent is finished and a fair number of concrete data, bearing on these matters, has been collected, these topics themselves are treated in much detail. By this arrangement, the study of these difficult subjects has been postponed one year, and they are then approached somewhat inductively. The authors regard this as one of the most important among their proposed changes in method.

The general principles in regard to industries, distribution of inhabitants, mutual relation of city and country, and dependence of

various sections upon one another, form another subject which, contrary to custom, is treated in the middle and latter parts of the volume. One reason for this is that these broad truths approach abstractions in their nature, and are, consequently, too difficult to be earlier appreciated by children. They are, moreover, to a large extent, a summary of what has preceded, and, therefore, naturally come last. A more inductive approach is, therefore, again highly desirable. Their great importance, also, has caused more than the usual amount of space to be given to them.

Physiographic Basis and Causal Sequence. — The authors believe that rational geography must rest upon a physiographic foundation. It is physiographic conditions which most often furnish the reasons for the location of human industries, the development of transportation routes, the situation of cities, etc. In other words, when the physiographic facts about a given region are clearly grasped, most of the other geographic facts easily arrange themselves as links in a causal chain. Thus the many details touching a certain locality are taught in relation with one another, so that they approach the form of a narrative, rather than that of a mere list of statements.

Physiography has, therefore, been introduced freely; but not too freely, provided each physical fact is shown really to function in man's relation to the earth. Physiography that is clearly shown to have a *real* bearing upon man greatly enriches the subject of geography; it is the *unused* physical geography that is a stumbling-block in the grades, and this we have tried to avoid.

Review of North America. — A common defect in the teaching of geography is that the facts previously learned about the United States fade from the pupil's memory while other countries are being studied. Yet the relation between North America and the other continents is so marked that this defect is unnecessary. For example, most of the industries and important principles of physiography and climate have received the attention of a child when he has completed a general study of the United States. Foreign lands illustrate the same great ideas under slightly different conditions. This means that the comprehension of foreign countries may best be gained by our children if they use their previous knowledge of the United States as a basis of comparison. If, then, this old related knowledge is carefully called to mind when the physiography, climate, and industries of a foreign land are approached, our pupils will not only secure a fuller appreciation of that region, but will also keep

fresh their knowledge of the United States by bringing it into use.

The above has been a controlling idea in preparing this volume. Accordingly in approaching the physiography of South America (p. 285), the physiography and climate of Europe (pp. 317–323), grazing in Argentina (p. 297), etc., we have reproduced the corresponding situation in our own country at some length. Besides this, we have included in the text scores of brief comparisons with the United States. By this means incidental reviews are continually provided, which are especially attractive to both teachers and pupils because they contain more of motive than the ordinary "review for review's sake."

To supplement this kind of review several sets of questions, which call for still different comparisons with the United States, are included in the book, one series being found at the close of the treatment of each continent. These are likewise rich in motive, inasmuch as they recall leading facts in regard to the United States from varying points of view. It should be kept in mind also that each set at the same time reviews another continent from a new point of view.

Many of the facts in regard to the United States which these questions call for are not presented in the text which treats of the various continents, and answers for a few of them are not indicated in the maps. Also pupils may have forgotten some of the important information about the United States. For these reasons Section XIII, covering eighteen pages, is an organized review of North America alone. It includes the principal facts about our continent which every pupil should know on completing the grades.

The title of the last section, "The United States compared with Other Countries," indicates provision for still further review. It has seemed to the authors an anti-climax to close several years' study of geography with the *Islands of the Pacific*, lands farthest away from us and of least interest to us. On the other hand, it has been deemed highly important that, after all the countries of the world have been treated, the closing chapter should summarize the situation and show the rank of our own land and its relation to others. This secures a final reconsideration of the principal facts in our geography, while at the same time it brings them into proper relation and perspective.

On the whole, we are of the opinion that reviews should occupy

a large part of the time of instruction; and by the plan followed we hope that pupils will have a fairly complete knowledge of the United States and the rest of the world in their possession, not only when they finish the grades, but in years to follow.

Types. — Another characteristic of this volume is that it deals with many of the fundamental ideas of geography at some length. As was suggested in the Preface of the Primary Book, the basal units for the study of geography, although constantly in use, are seldom adequately presented in the text-books. This applies strikingly, for example, to such topics as farm, cattle ranch, irrigation, lumber camp, and factory. In order to remedy this defect as far as possible, each subject of such a kind is presented in these books with as much detail as space permits, and in connection with that section of country in which it seems most prominent.

For example, lumbering, fishing, and the manufacture of cloth, boots, and shoes receive their most detailed treatment in connection with New England; the mining of coal and iron are and the manufacture of iron goods are discussed in connection with the Middle Atlantic States; and gold mining, irrigation, and grazing are naturally included under the Western States.

The industries and objects thus described, being fairly typical of industries and objects found elsewhere, are on that account worthy of being called *types*. Through the careful presentation of such types, vivid pictures and an appreciation on the part of the pupils are assured.

The study of the United States has, as suggested above, furnished occasion for detailed treatment of most geographic types. Some important features and occupations, however, are not found in the United States, and to these we have endeavored to give the same careful consideration. For instance, so far as space permits, the Brazilian forest is presented as a type of tropical forests (p. 294). Other illustrations may be found in the treatment of the linen industry on page 336, and of the silk industry on page 359. The object is to continue to acquaint the learner properly with the basal units of geography.

Relative Worth of Facts. — Good judgment is nothing more than proper appreciation of the relative worth of knowledge. Certainly geography should be utilized for the development of this quality. The study of any subject by types tends in this direction, because types themselves are the topics of special value. The frequent comparisons provided for at the close of many of the chapters

accomplish the same purpose, for they lift the more important thoughts into prominence while neglecting non-essentials. Similarly the two review chapters, one a Review and Comparison of our states, the other a Comparison of the United States with other countries, distinguish in a marked way the leading from the minor facts. But, above all, throughout this volume the subject-matter in each chapter is presented under few headings, so that the learner is likely to be impressed with the simplicity of the situation. The authors, at least, cherish the hope that the pupil will see the outline clearly even in the midst of the necessary mass of details. Certainly it is one duty of a text to teach a child to separate major from minor points and to carry the outline in mind.

The need of more attention to this matter of perspective is most clearly shown in the study of the United States by individual states. To be sure, there is a call for a knowledge of our own country by states, and an endeavor has been made to meet it by several sets of questions which require a careful state review. But when the geography of the United States is presented *primarily* by states, the child is oppressed and confused by the great number of individual facts which have apparently the same rank. Even an adult cannot easily escape a feeling of confusion on reading a few pages from any modern geography that divides the subject into such small units. The remedy, therefore, is to proceed by much larger divisions, *i.e.* by groups of states.

Thus farming by irrigation is only one topic, and only once treated, for the entire western division of states. Several pages are devoted to a discussion of the subject, including the manner in which irrigation is planned, its influence on the value of land, the localities most noted for irrigation, and the cities in the different states that are largely indebted to it for their growth. These many details are associated as parts of one story. By this means the children's minds may be led to dwell long enough upon one topic to insure interest in it; and as there are only a few such topics in the entire chapter on the Western States, each indicated, too, by special type, it is not difficult to keep in mind the leading points.

Similar provision for relative values in the study of foreign countries is clearly illustrated in the chapter on the British Isles.

Political Maps. — Since it is necessary to represent more places and present more details, the political maps in this volume are for the most part larger than in the Primary Book; but they are of the

same quality. An important feature is the grading of cities according to population — the more important the city, the larger the type used. The principal features of relief are placed upon the map, though without interfering with the clearness of the political divisions. In the color arrangement care has been used to gain an artistic effect, and at the same time to preserve the distinctness necessary in such maps.

No attempt has been made to preserve the same scale for the different maps. One of the objects of the study of geography is to teach the meaning and use of maps. To do this, one of the first and most fundamental points is to teach the pupil to understand the meaning and importance of the system of proportion, or of "scale." In one book are maps of various scales; in the first atlas, or in the first wall map which the pupil sees, there are still different scales. The pupils must be prepared to expect and to understand these differences, and it is the teacher's duty to see that they are so prepared. By the insertion of Pennsylvania as a key, and by some of our map questions, we have attempted to aid in this training of the sense of proportion.

Other Illustrations. — Besides the relief indicated on the political maps there are individual relief maps made especially for this series. The relief maps of the continents are pronounced by experts to be the best thus far made.

The city maps are intended to serve to illustrate the surroundings which determine the growth of the large cities, including, of course, the transportation facilities by water and by rail. Attention is also called to the maps showing the distribution of the important industries and to the diagrams that accompany them. These are all placed in the summaries with which they are most closely related; but the teacher will naturally find occasion to use them and refer to them in connection with the study of the earlier sections. A series of maps is also introduced which gives a graphic view of the density of population of the continents. All the railway lines of each of the continents excepting Europe are also shown either on the political maps or else by special maps. The colonies of some of the leading nations are given in two full-page illustrations; and the great commercial routes of the world are represented by a single-page map. It is believed that this large number of maps, each devoted to a specific object, will be found of great value.

Besides the maps and diagrams there are many half-tones of photographs selected to supplement the text. They are not introduced merely as pictures, but as part of the fund of information offered. For this purpose the half-tone is the best-adapted; there is reason for confidence in the accuracy of such views.

Acknowledgments. — The political and many of the black maps are made by the Matthews-Northrup Company, of Buffalo; the relief maps, by E. E. Howell, of Washington. The world maps showing the distribution of products are in part based upon maps kindly furnished to us by the Philadelphia Commercial Museum, and a few of them are actual reproductions of the museum maps. Our photographs have been selected from various sources, but the larger number have been purchased from William H. Rau, of Philadelphia. Through the kindness of Commander Webster we have obtained permission to use the photographs reproduced in Figures 406, 432, 433, and 434; and Figures 278, 289, 290, 447, 469, 473, and 477 are borrowed from Ratzel's "History of Mankind." A number of European views were loaned by Dr. Heinrich Ries, of Cornell University, and the wash drawings were made by Mr. C. W. Furlong, also of Cornell.

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FIG. B.

"The breaking waves dash high . . ." at Point Conception, California.

FIG. C.

El Capitan, Yosemite Valley.

FIG. D.

"First Americans." Type of North American Indian.

Part I

NORTH AMERICA

I. PHYSIOGRAPHY OF NORTH AMERICA

The Growth of the Continent. — There are over one hundred million persons in North America at the present time, although a century ago there were scarcely one tenth of that number. This wonderful growth has been largely due to the useful and valuable mineral products of the earth; to the soil and climate which have allowed many different kinds of plants and animals to thrive; and to the rivers, waterfalls, lakes, and harbors which have made manufacturing and shipping easy.

As it takes time to build a house, and to prepare the boards from trees, the nails from iron ore, and the bricks from clay, so it takes time for the formation of minerals and rocks and for the building of a continent. In fact, millions of years have been required for that work.

The story, telling how North America was made, is a very interesting one. It has been discovered by a careful study of the rocks; and although there are many questions that no man is yet able to answer, we are prepared to tell a part of the story.

At one time the earth was probably a white-hot sphere like the sun; but in time the outside cooled to a crust of solid rock. The interior, still heated, continued to shrink and grow smaller, as most substances do when cooling. This caused the solid crust to settle and wrinkle, much as the skin of an apple does when the fruit is drying. Water collecting in the depressions formed the oceans, while between them, where the elevation of the earth's crust was greatest, rocks appeared above the sea level. Thus North America and the other continents were born.

In its babyhood, although the center of the continent was still a broad sea, the eastern and western parts doubtless resembled the West Indies of to-day, which you will find on the map of North America (Fig. 42, following p. 48). Those islands are the highest parts of a mountain chain. They *seem* to be separated only because

the ridges upon which they rest do not rise high enough to reach above the water (Fig. 1).

In early times North America consisted of chains of islands. Finally, the land rose higher, forming one mountain range in the

FIG. 1.

The West Indian region as it would appear if the ocean water were removed.

East, and other ranges in the West. Then the plains between the mountains slowly emerged from the ocean.

The Coal Period. — Ages after the beginning, a period arrived when in the northern part of North America it was much warmer than now, and the rains were far heavier. During that period our *coal* was made out of plants. Beneath the coal beds, in the rock which was once soil, roots of plants may still be seen, while stems of plants, and even trunks of trees changed to coal, reach up into the coal beds. Also a careful examination with the microscope, or at times even with the naked eye, shows that coal is composed of bits of plants

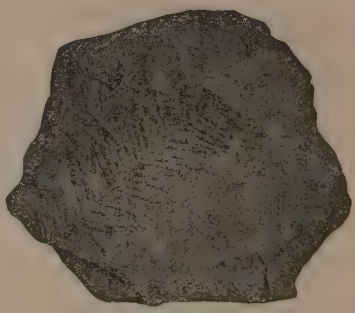


FIG. 2.

Rock containing a fossil fern which grew in the swamps of the coal period.

closely pressed together. Frequently the full form of a fern or leaf may be seen (Fig. 2).

As the crust of the earth shrinks and wrinkles, the land is raised and lowered. Even now it is slowly moving in some places, and was doing the same during the coal period. At that time some of the old sea bottom was raised above the water, forming extensive plains in the eastern part of North America. Plants had long been growing; and these plains were so low and level that vast swamps were produced (Fig. 3), on which the vegetation was extremely rank, like a tropical jungle. After the swamp plants had grown for hundreds of years, the plains sank beneath the sea, and the vegetation became covered with layers of sand, gravel, and mud, which have since hardened into rock.

FIG. 3.

The way the coal swamps appeared, so far as we can tell from the fossils which have been preserved.

After another long period the sea bottom emerged once more, and the dense swamp vegetation returned; but this time the plants grew with their roots in the ocean mud which had buried the earlier swamp. After many more years the plains again sank, and the swamp vegetation was buried as before. This rising and sinking of the land continued for ages, one set of layers of rock, soil, and vegetation being covered up by another, until many such sets were formed.

FIG. 4.

A view in the Dismal Swamp of Virginia. Compare Fig. 3 with this to see how different the trees are.

Though the swamps were, no doubt, somewhat similar to those which may now be seen in many places, the vegetation grew far more thickly, perhaps even more thickly than in the jungles of

India or the everglades of Florida. Also the plants were so different from those of the present (Fig. 4), that not a single species now living grew in the coal swamps.

When the plants died, they fell into the water, making a woody matting which did not fully decay, because the water prevented air from reaching it. If it had been dug up and dried, it might have made good fuel. Indeed, it is now the custom in Ireland, Norway, and some other cool, moist lands to dig such matter out of the swamps and dry it, forming *peat*, a fuel used for cooking and heating.

Some of the poorer coals of the West, known as *lignite*, are little more than peat beds partly changed to mineral coal. Other coal, called *anthracite*, found especially in the mountains of Pennsylvania, has been changed so greatly that it is as hard as some rocks, and is known as *hard* coal. But most of the coal that is mined, — as that of western Pennsylvania and the Central States, — although quite like a mineral, and harder than lignite, is not so hard as anthracite. This is called *soft* or *bituminous* coal.

The woody matting that gathered in some of the swamps grew to be scores of feet in thickness; but, on being covered up, it was pressed more tightly together. As the number of layers above increased, causing the pressure to become very great, it gradually changed into coal, making coal beds that are often from six to twelve feet in thickness.

Fig. 5.

Tilted layers in the Rocky Mountains of Colorado. They were deposited as horizontal beds in the sea, as those of the Colorado plateau were (Fig. 7); but, during the mountain folding, they have been turned up on end, and then worn away and irregularly carved by the rains.

All this time, and at other periods during the formation of the continent, iron, copper, gold, silver, building stones, and other materials that we need every day, were also being slowly formed; but we cannot now tell their story.

The Mountains and Plateaus. — During the millions of years that the continent was growing to its present form, there were rising, in the East and West, mountain systems and surrounding plateaus that were to have a great influence upon our climate, and therefore upon our crops, our animals, and ourselves. Being very old and much worn down, the eastern mountains,

called the *Appalachians* (Fig. 10), are neither very high nor very rugged, though they have some peaks which reach more than a mile above sea level. The western mountains, or *Cordilleras*, being younger and therefore less worn, are more rugged, and have peaks rising three miles and more above sea level. At the base of the Appalachians is a narrow plateau rarely more than fourteen hundred feet high; but the Cordilleras tower above a broad plateau which is itself more than a mile in height, or as high as the mountain peaks of the East.

Many of the rocks of the mountains and plateaus were deposited as sediment in the sea and afterward raised to their present position by the movements of the earth's crust. In spite of their great elevation, the plateaus have remained level because the rock layers, or *strata*, of which they are made, were kept in a horizontal or level position while being uplifted. This can be seen where rivers have cut deep channels in the earth, showing the layers of rock to be nearly as level as when they were a part of the ocean floor.

On the other hand, the wrinkling of the earth's crust has in some places broken and folded the rock layers, and formed lofty mountain ranges in which the strata have been tilted and upturned, instead of remaining level (Fig. 5).

A part of the height of mountains is due to the fact that they rest upon a platform of tablelands about them. Therefore a mountain crest two miles above sea level *may* really rise less than a mile above the plateau at its base.

Mountains are lower than they would be if they had not been attacked for ages by the weather and the rivers. Not only have they been *lowered* by these means, but also greatly carved and sculptured, being cut into ridges and peaks, and crossed by deep canyons which the rivers have dug out.

After mountains have ceased rising, their peaks are lowered, and their valleys broadened, until they lose much of their mountain character, as in the case of the Appalachians. Indeed, they may even be reduced to a series of low hills, as in southern New England, which is really an ancient mountain region now worn down to its very roots.

The folding, breaking, and sculpturing of the mountain rocks have had an important effect upon mining. As you see from Figure 7, these changes often bring to view valuable minerals which were formed ages ago and are now deeply buried in the strata.

As we have seen, some mineral deposits, like coal, were laid down in beds between other layers of rock; but many valuable minerals, such as gold, silver, and copper ores, were deposited in cracks of the mountain rock, forming *veins*. Into these cracks hot water, often heated by deeply buried masses of lava, has brought valuable metals and deposited them in

veins. Iron ore also has been deposited by water in beds and veins, though not always by hot water.

Volcanoes. — Hundreds of mountain peaks in the West, instead of being made in the manner just described, are *volcanoes*. These are built of molten rock that has been forced to the surface from within the earth. Though no longer active, these peaks are *known* to be volcanoes because of their cone shape, the hollows or *craters* in their tops, and the lava and volcanic ash of which they are made.

Doubtless some of these volcanoes have recently erupted; indeed, one, Mt. St. Helens in Washington, is reported to have been in eruption about a half century ago. Another, a hundred miles southeast of Mt. Shasta (Fig. 6), poured forth lava a short time ago. This is known because the lava flow dammed up a stream, forming a lake, the waters of which rose into the surrounding forest, and killed the trees; but the trees still stand in the lake, not having had time to decay.

Hundreds of thousands of square miles of this western country are covered by lava flows. The soil produced by decay of the lava is often extremely fertile, and that is one of the chief reasons why the central and eastern part of the state of Washington, which is largely covered with it, has become noted for its fruit and wheat. There the lava flowed out from

FIG. E.

Vesuvius in eruption in 1872, showing the steam rising from the crater; also from the lava that is flowing down the slopes.

FIG. 6.
Mt. Shasta, California.

Stanch in fiercest sunset fire I saw
Him tower bold against the sunset sky,
And as I gazed new strength, new worlds were mine,
And all my heart went up to Him on high.
— MRS. MATILDA PRUSCH HART

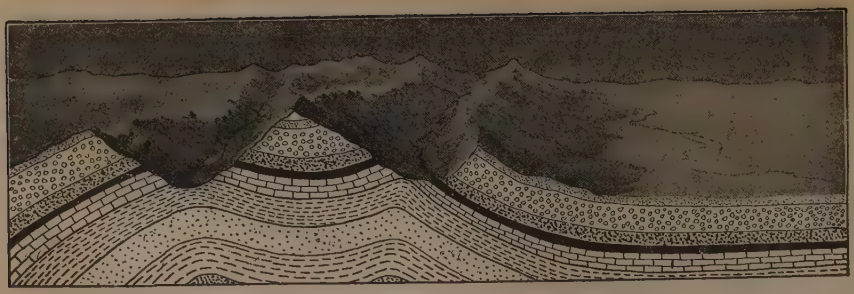


FIG. 7.

A section in the earth, where the rocks are folded, to show how a bed of valuable mineral, such as the black layer, may be brought to light by folding and river cutting, while elsewhere it is deeply buried.

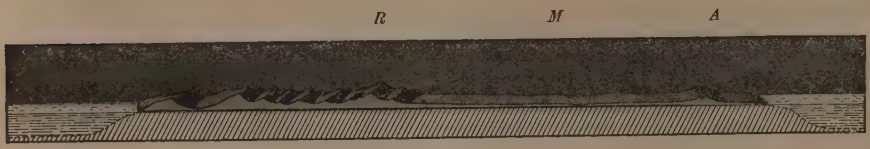


FIG. 8.

Section across the United States, to show the two highlands and the great trough between. *A*, Appalachians; *M*, Mississippi; *R*, Rocky Mountains.

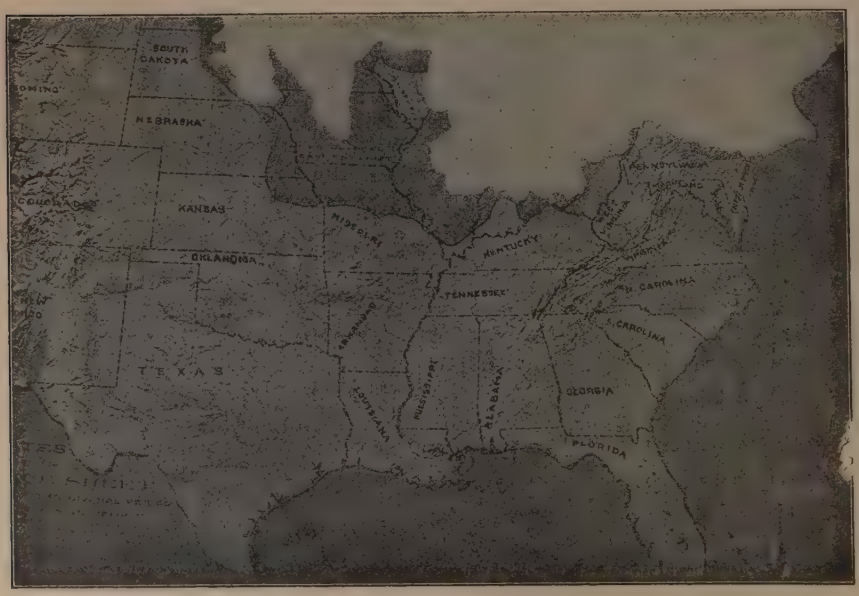


FIG. 9.

Model showing the distance which the Great Ice Sheet reached in the United States. (Model made by E. E. Howell, Washington, D.C.)

great cracks or *fissures* and flooded immense areas of country. The area of the lava flows in the Columbia and Snake river valleys is more than twenty-five times as great as the area of Massachusetts.

The Trough between the Two Mountain Systems.—From the mountain systems of the East and West, the land slopes gently toward the Mississippi River (Fig. 10), which flows in the trough made by the uplift of the two sides of the continent. Measure the width of this trough on the map of the United States.

This extensive lowland has had a long history, like the mountains. In the early ages so much of it was under water that a great sea extended from where the Gulf of Mexico now lies to the Arctic Ocean. In the rock layers are found many remains, or *fossils*, of shells, corals, and fish that lived in the sea of this ancient time. Upon dying and dropping to the bottom, these animals were entombed in the beds, which have since been hardened to rock.

After a time most of this sea bottom was raised to form dry land, although a part of it which extended from the Gulf of Mexico to southern Illinois continued to remain under water. Into this sea the Mississippi discharged its floods and dropped its load of soil, swept from the distant fields and mountains. As time went on, the river filled up the sea and formed flood plains, which — raised by a slight uplift — are among the most fertile lands of our country. And now the river seems bent on filling up the Gulf itself.

Although the mountains and plateaus of our country are so far away from the lowlands, they have a great influence upon them. The Mississippi Valley, in all but its southern part, is in a belt of the earth where most of the winds blow from the west. Since these winds blow from the Pacific Ocean, they are at first damp; but upon reaching the western highlands, they are compelled to drop much of their moisture, and then they pass on into the Mississippi Valley as dry winds. This causes the plains and plateaus of the northwest to be dry or *arid*. The eastern and southern portions of the valley have a more humid climate. The reasons for this are that this region is so near the Gulf and the Atlantic, and is separated from the latter by such low mountains, that damp ocean winds are able to reach it.

The *direction* in which the ranges extend is a matter of great importance, also. Since the mountains run north and south, the warm south winds find no highlands to check their northward course. Therefore, they are able to carry warmth and moisture a great distance, even far into the

FIG. 10.

Relief Map of North America

FIG. 11.

Some hummocks in a moraine formed by the Great Glacier near Ithaca, N.Y.

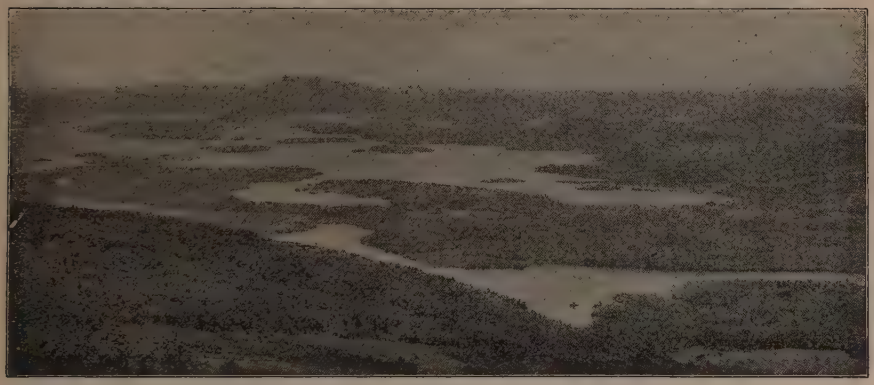


FIG. 12.

A New England lake formed by a dam of drift left by the glacier. It is very irregular because the water behind the dam has risen into many valleys, leaving only the hilltops above the surface.

FIG. 13.

A picture of the irregular coast of southern Alaska, near Sitka, where the sinking of the land has drowned the valleys, leaving only the hilltops projecting above the sea.

northern part of the United States. In consequence, the Mississippi Valley is one of the largest and finest farming sections in the world, producing a great variety of crops. Where the summers are shortest, though still warm, excellent wheat is raised; farther south, corn is the principal crop; and in the southern part, where the summers are longest and hottest, tobacco, cotton, sugar cane, and rice are grown.

How different it would be if a great mountain system extended east and west across the continent! The warm summer winds could not, then, carry their warmth and moisture so far north; neither could the north winds, which are cool in summer and cold in winter, reach so far south. The north winds are very important; they moderate the heat of summer and bring cool weather in winter. Sometimes they do damage in winter by causing destructive frosts, even as far south as Florida. Then the orange and lemon trees suffer greatly. But they also do good, for too much heat takes away the vigor of the people, while cool air makes them more active.

The Great Ice Age. — Long after the coal beds were formed, and the great highlands and valleys were built, another very important event happened in the preparation of this continent for our home. That was the formation of a great *ice sheet* or *glacier*, which covered a large part of northern North America. This glacier had much to do with making the lakes, waterfalls, and even the soil itself, in that section.

FIG. 14.

Face of Muir Glacier, Alaska. It is a great waste of ice, slowly moving down from the interior to the coast and ending in the sea, where icebergs break off and float away. Some of these may be seen in the picture.

The Greenland glacier (Fig. 15) is made of snow which has fallen on the high interior in such immense quantities that the pressure upon the under part has changed it to ice, as pressure from your hands will change a snowball to ice. As the snow collects and becomes ice, it spreads out, or *flows*, from the interior toward the coast, much as a piece of wax may be

FIG. 15.

The ice front of a Greenland glacier.

made to flow if a weight is placed upon it. Moving toward the sea, the glacier drags away the soil, tears off fragments of the rock, and scours the rock layers, as if it were a great sand-paper. The movement is very slow, yet the ice is always pushing onward to the sea, where enormous *icebergs* are continually breaking off and floating away (Fig. 14).

The glacier which formerly extended over a part of our continent was likewise made of snow. It covered most of northeastern America, reaching as far south as New York City and the Ohio River, but not so far south in the Northwest (Fig. 9). Being over a mile deep in its thickest part, and in consequence very heavy, the glacier swept away the soil which had previously been made, as well as fragments of solid rock.

Although the glacier was always pushing southward into our country, its southern end was continually melting away, owing to the warmer climate which it met. At times the movement was just rapid enough to supply the waste due to this melting, so that the edge remained in nearly the same position for years. All this time the sand, gravel, and rock,

which had been carried along in the ice, were being piled up along the line where the glacier melted, forming a great mass called a *moraine*.

After standing for a while and building a moraine in one place, the glacier front often advanced to the south, or melted away toward the north, building up other irregular piles of moraine hummocks.

During the thousands of years that the glacier lasted, it carried millions of tons of clay and rock from one place to another and built many low hills. As it slipped over the surface, it ground boulders and pebbles together and rubbed them against the solid rock, scratching and grooving it (Fig. 16). Scratches thus made may still be seen pointing northward, toward the place from which the glacier moved. This work of rasping, digging, carrying, and dumping done by the glacier has led to its being compared to a combined file, plow, and dump cart of immense size.

Finally, after thousands of years, the great ice sheet melted away. No one is able to say why it came or why it went away; but that it *was here* and did the work described, all who have studied the subject are fully convinced.

It was this glacier which caused the great number of lakes in the northeastern part of North America. Minnesota alone is said to have ten thousand, and in New England there are also thousands (Fig. 12 and Fig. 58, p. 64); but most of the states outside of the glacial region have extremely few.

FIG. 16. Scratches on a rock made by the glacier in passing over it.

The manner in which these lakes were formed is as follows: The load of clay and boulders, or *drift*, as it is called, was dumped irregularly over the land. It sometimes partly filled valleys and built up dams, behind which ponds and lakes collected. The glacier also formed lake basins by digging, or plowing, directly into the rock. Even the Great Lakes did not exist before the glacier came; their basins occupy broad river valleys which have been blocked by dams of drift and deepened by the plowing of the Great Ice Sheet.

The glacier also had an important influence upon our manufacturing. Its load of rock fragments often filled parts of valleys so that, after the ice was gone, the streams were compelled to seek new courses. These courses often lay down steep slopes or across buried

ledges, over which the water tumbled in a succession of rapids and falls. Even the great cataract of Niagara was caused in this way, and the same is true of many of the falls and rapids of hilly New England and New York. The many lakes act as storehouses to keep the noisy falls and rapids well supplied with water. For these reasons New England and New York have such abundant water power that they early grew to be the greatest manufacturing centers of the Union. In sections of the country not reached by the glacier, rapids and falls are much less common. Did the glacier cover the land on which you live?

A third important influence of the glacier was upon the soil. In most other parts of the country the soil has been made by the *decay* of rock (see Primary Book, p. 2); but in the glacial region the decayed rock was swept away and replaced by drift brought by the

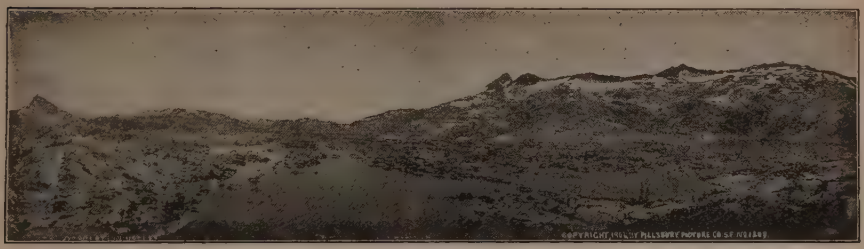


FIG. 17.

Desolation Valley, California, showing effects of a glacier.

glacier. This was made by the grinding of rocks together, much as flour is made by grinding wheat; in fact, glacial soil is sometimes called *rock flour*. As the glacier scraped along, it ground an enormous quantity of rock to bits, so that when it melted, a layer of drift was left, in some places reaching a depth of several hundred feet. Most of the clays from which bricks are made in the North were also brought by the ice sheet.

With the melting of the glacier, much water was produced. This washed out and carried off a great deal of clay, in some places leaving extensive sand and gravel plains, making a soil not very fertile (Fig. 17).

The bits of ground-up rock left by the glacier have an important effect upon the soil. Since these fragments were gathered up from many places, and from many different kinds of rock, they sometimes cause a fertile soil in places where the decay of the rocks would have naturally caused a sterile soil. In some places the glacier failed to grind the rock into tiny bits, leaving pebbles and even large boulders to cover the ground.

The Coast Line. — In studying about the Mississippi Valley and the formation of coal, we have seen that the land and sea bottom are not fixed, but that they often slowly rise or sink.

Such changes in the land level are even now in progress in many places, though so slowly that it requires years, and even centuries, to notice them. For instance, along the coast of New Jersey the land is sinking at the rate of about two feet a century, while the land around Hudson Bay is rising.

Some of the recent changes in the level of the land have had an important effect upon the coast line. For example, the reason we find so many islands and peninsulas along the northeastern coast (Fig. 42) is that this section has been lowered several hundred feet. By this means the ocean water has been allowed to enter the valleys, while the higher land between them extends above the water in the form of peninsulas, capes, and islands.

The peninsulas of Labrador and Nova Scotia, and the hundreds of islands along the northeastern coast, including Newfoundland, owe their existence to this sinking. The irregular Pacific coast from Puget Sound northward (Fig. 13) was produced in the same way.

By this sinking of the land many good harbors were made, the best ones being where rivers enter the sea. When the land was higher, the streams carved out broad valleys, into which, when the land sank, the sea water entered, forming bays and harbors. That is the way the Gulf of St. Lawrence was formed; also New York, Delaware, Chesapeake, and San Francisco bays, as well as the many excellent harbors of the East.

FIG. 18.

A part of the raised sea bottom which forms the level plain of Florida.

One reason for so few good harbors along the coast of the Southern States is that the land in this section has been *rising* out of the sea. Just off the coast is a broad ocean-bottom plain where the water is shallow (Figs. 43, 63, and 86), while still farther out, the bottom slopes rapidly and the ocean becomes very deep.

That part of the Southern States which borders the Gulf of Mexico and the ocean was once a portion of this ocean-bottom plain; but it has been raised until it is now a low, level plain (Fig. 18). Since the continental shelf is so level, when a part of it was lifted above the water there were few places for deep inlets, bays, and harbors. After being raised, the coast was slightly lowered; but the bays thus formed are shallow and the harbors poor.

The level plain of the Florida peninsula is also a sea bottom that has been lifted above the ocean. Many of the lakes and swamps which abound in that region are believed to be due to the shallow basins built by the irregular deposit of sediment on the old sea floor.

Size, Shape, and Position. — North America is third in size among the six continents of the earth. By reference to the tables in the Appendix, find which are larger and which smaller.

After being changed in shape during millions of years, owing to the rising and sinking of the land, it at present has the form of a triangle with the broadest portion in the north. Draw the triangle. Compare its shape with that of South America and Africa (Fig. 512). The northern part is so wide that Alaska extends to within fifty miles of Asia; but Labrador is over two thousand miles away from Europe. The distance from Alaska to Asia is so short that the early ancestors of our Indians and Eskimos probably first reached North America by crossing over from Asia. On account of the greater distance across the Atlantic, Europeans for a long time did not know that North America existed; but it is certain that the Norsemen from Norway visited our shores nearly five hundred years before Columbus discovered the continent.

Those portions of North America which are nearest to Asia and Europe are so cold that few people live there. Farther south, where most of the inhabitants live, the continents are spread farther apart, as you will see by examining a globe. The broad Atlantic must be crossed in passing from Europe to America; the difficulty of sending large armies with necessary supplies, this great distance across the sea, helps to explain why the Spanish colonies were able to win their independence from Spain, and the United States from England.

This separation of Europe from America has also helped in the development of our industries. At first, the colonists brought even bricks, doors, and timber from Europe; but although the ocean is an excellent highway, it is expensive to send goods such long distances. Therefore the settlers soon learned to raise and make most of the articles that they needed for food, clothing, and shelter.

Nevertheless, the ocean is such an excellent highway that ships are able to sail across it in every direction and bring what we really need, or carry back such products as cotton and tobacco, which Europeans desire. Ships have also brought to us the hundreds of thousands of English, Irish, Germans, French, Swedes, and others who have settled and developed our country, and whose descendants are its citizens. Since Europe is our *mother land*, it has been, and is still, very important to keep in close touch with its various nations. This has been made possible partly by the shortness of the journey, now that vessels are moved by steam, and partly by the excellent harbors caused by the sinking of our coast.

The Pacific Ocean is much wider than the Atlantic (see a globe), and therefore much more difficult to cross. Although the shores of Asia which face North America are densely settled, until recently we have not needed to have much commerce with the inhabitants of that continent because they were not very progressive. Now, however, the Japanese have adopted the methods of modern civilization, and we have come into control of the Philippine Islands, so that many of our ships cross the Pacific.

South America is also easily reached by water, and there is much trade with the various countries of that continent. Although South America is joined to North America by the narrow Isthmus of Panama, there is at present no railway connecting the two continents, though one is being planned. This isthmus is a great barrier to ocean commerce between eastern and western United States and between the Eastern States and Asia. It is very narrow, and in places only two or three hundred feet high; yet, because it is there, ships must travel thousands of miles around South America. A railway crosses it, and a ship canal is being built across the isthmus. Of what advantage will this canal be to the United States?

Summary. — So we see that our continent, as we know it, has not been here from the beginning; instead of that, millions of years have been required to prepare it for us. Ocean bottoms have been lifted into mountains, plateaus, and valleys; coal beds, building stones, and valuable minerals have been formed; a mighty glacier has swept over the country, grinding rock into powder and causing lakes, water routes, falls, and rapids, and the coast

has been sinking here and rising there, producing fine harbors in some places and greatly increasing the extent of the plains in others. Our very position, separated by the ocean from the Old World, and yet enabling us to reach it when it is necessary, is an advantage.

REVIEW QUESTIONS. — (1) What was the condition of North America in early times? (2) What is coal made from? Tell how it was formed. (3) What proofs are there of this formation? (4) What is peat? (5) Name and locate our two chief mountain systems. (6) How high are the plateaus at the base of each? (7) Explain why the plateaus are so level in spite of their height. (8) How have the mountains been made? (9) Explain what effect this has had upon mining. (10) Tell about the volcanoes of the West. (11) Why is the Mississippi Valley called a trough? (12) What was its condition in early times? (13) How was the interior sea finally changed to dry land? (14) Mention some ways in which the mountains control the Mississippi Valley. (15) What differences would follow if the mountain ranges extended east and west? (16) Describe the Greenland glacier. (17) How far did the great American ice sheet reach? How deep was it? (18) What are moraines? (19) What do the scratches on the rocks tell us about the glacier? (20) Why is a glacier compared to a plow? A file? A dump cart? (21) In what ways did the glacier cause lakes? (22) Falls and rapids? (23) Soil? (24) What effect has the glacial soil upon farming? (25) Tell the whole story of the glacier. (26) Why are there so many islands, peninsulas, bays, and harbors in the northeast? (27) Name some of them. (28) How have some of our largest bays been made? Name them. (29) Why are there so few harbors on our southern coast? (30) What is the cause of the southern plains? (31) What is the continental shelf? (32) How does North America compare in size with the other continents? (33) How far is the mainland from Asia and Europe? (34) Show how our position is a favorable one. (35) What is the influence of the Isthmus of Panama?

SUGGESTIONS. — (1) Make a collection of different kinds of coal. (2) Examine some pieces of soft coal closely to see if you can discover plant remains. (3) Obtain some peat. (4) Learn what you can about coal mining. (5) Examine layers of rock in your neighborhood to see if they are horizontal or tilted. See if they contain fossils. (6) Explain the meaning of shading in Fig. 10. (7) Make a model of a volcano out of sand or clay. (8) What becomes of the Greenland icebergs? (9) Make a map showing the extent of the American glacier. (10) What signs of the glacier, if any, can you find in your neighborhood? (11) Name several great cities that have grown up about our Northern harbors. Name some in the South. (12) Draw an outline map of the northeastern coast, and another of the southern coast, to see how they differ. (13) How many days long is the voyage, on a fast steamer, from New York to Liverpool? How many miles an hour does the steamer go? How many miles does that make the distance? (14) How long is the journey from San Francisco to Manila? (15) From New York to Manila by going eastward? Through what waters would one pass on such a voyage?

For REFERENCES TO BOOKS AND ARTICLES, see the *Teacher's Book* of this series.

II. PLANTS, ANIMALS, AND PEOPLES

The climate of a region is one of the most important facts concerning it; for where temperature and rainfall are favorable, plants usually grow luxuriantly. And since plants furnish animals with food, where vegetation is luxuriant, animal life may be abundant.

Since North America extends far north and south, and possesses lofty mountain ranges and inclosed plateaus, it has a great variety of climate, and, therefore, a great variety of plant and animal life.

Fig. 19.

Arctic poppies growing on the edge of a snowbank.

Plants of the North. — The northern part of the continent is bitterly cold. In that region there is a vast area where the soil is always frozen, except at the very surface, which thaws out for a few weeks in summer. On account of the frost, trees such as we are familiar with cannot grow. Their roots are unable to penetrate the frozen subsoil and to find the necessary plant food. There are some willows, birches, and a few other plants with woody tissue, bark, leaves, and fruit; but instead of towering scores of feet into the air, they creep along the surface like vines, and rise but an inch or two above ground. Only by thus hugging the earth can they escape the fierce blasts of winter and find protection beneath the snow.

A few grasses and small flowering plants grow rapidly, produce flowers, even close by the edge of snowbanks (Fig. 19), and then pass away, all within the few short weeks of summer. Some of these plants produce berries, which after ripening are preserved by the snows; thus, when the birds arrive in the spring, they find food ready for them.

Animals of the North. — The summer development of insects is rapid, like the growth of plants. As the snow melts and the surface thaws, the ground becomes wet and swampy, and countless millions of insects appear. Among them the most common is the mosquito. There are few parts of the world where this insect is a worse pest than on the *barrens* of North America and the *tundras* of Europe and Asia, as these treeless, frozen lands are called.

Few large land animals are able to thrive in so cold a climate and where there is such an absence of plant food. The reindeer, or caribou, the musk ox, polar bear, white fox, and Arctic hare are the largest four-footed land animals (Fig. 21); and the crow, sparrow, and ptarmigan are the most common land birds.

Fig. 20.
Walrus on the Arctic floe ice.

The ptarmigan changes its plumage to white in winter. Some of the other animals of the Arctic, such as the fox, polar bear, and hare, are also white. This serves to conceal them, in that land of snow and ice, so that they may hide from their enemies, or steal upon their prey unawares.

The tiny white fox feeds upon birds and other animal food; but the other land animals, except the polar bear, live upon plants, such as berries, grass, and moss. The caribou finds a kind of plant, called "reindeer moss," which grows upon rocks that rise above the deep winter snows. If it were not for this, the reindeer would not be able to live through the long winter. Often also he paws through the snow to find this moss.

While some animals live upon the land in the Arctic regions, many more have their homes in the sea, because there, except at the very surface, the temperature never descends below the freezing point. Therefore there is plenty of animal life of all sizes, from the very tiniest forms to the whale, the largest animal in the world. During the winter the surface of the sea freezes over; and then many of the sea animals migrate southward. Even the huge walrus (Fig. 20) moves clumsily toward a more favorable

climate. The birds go farthest, especially the geese, ducks, and gulls, which fly to Labrador, New England, North Carolina, and even farther south, to spend the winter where their food is not covered by ice.

Sea birds exist by hundreds of thousands (Fig. 21), building their nests upon rocky cliffs in immense numbers. Indeed, they are so numerous that, when suddenly frightened, as by the firing of a gun, they rise in a dense cloud that obscures the sun. Then, with their cries they produce a din that is almost deafening. In the water, seals (Figs. 190 and 266) and walruses live, the former being so valuable for their oil and skins that men go on long voyages to obtain them. The oil comes from a layer of fat, or "blubber," just beneath the skin, that serves to keep out the cold.

The seal is the most common of the Arctic sea animals, and is the principal food of the Eskimo and polar bear (Fig. 266). The bear, protected from observation by his white color, stealthily creeps upon his prey, asleep upon the ice; or, he patiently watches until his victim swims within reach, and then seizes him with his powerful claws.

Plants and Animals in Western North America. — A large area in western United States and Mexico has a very slight rainfall, although its temperature is agreeable. This arid area includes most of the territory having less than twenty inches of rain.

In some places, as near the Pacific coast and upon the mountain tops and high plateaus, there is rain enough for forests to thrive; but in most parts of the Far West the climate is so dry that there are no trees whatsoever. Indeed, some portions of the West are desolate in the extreme and inhabited by those peculiar forms of life, both plants and animals, characteristic of true deserts.

One common plant is the bunch grass, so called because it grows in little tufts or bunches. The sage bush, a plant with a pale green leaf, named because of its sagelike odor, is found throughout most of this arid region. Other common plants are the mesquite, the century plant with its sharp-pointed leaves (Fig. 199, p. 209), and the cactus with its numerous thorns. In favorable spots, in the warm Southwest, the mesquite grows to large size. The cactus in the North is always low with few varieties, while in the Southwest it grows in greater variety and, in some cases, even to the height of trees (Fig. 23).

On account of the extreme dryness of the climate, these plants have a severe struggle for existence, and adopt peculiar means for protecting

FIG. 21

Some of the animals of the North. The great auk had such small wings that it could not fly. It was killed in great numbers by sailors, and has been completely exterminated

FIG. 22.

Some of the animals of the plateaus and mountains of the Far West

themselves. For example, the cactus, unlike other plants, has no leaves. It thus exposes little surface to the air for evaporation. In its great, fleshy stem it stores water to use through the long, dry seasons, while spines protect it from animals in search of food. Some of these plants, as mesquite, are so bitter that they are not eaten by animals. The mesquite also protects itself by spines, and in addition has such large roots that the part of the plant under ground is greater than that above. The roots of this plant are an important source of wood for fuel.

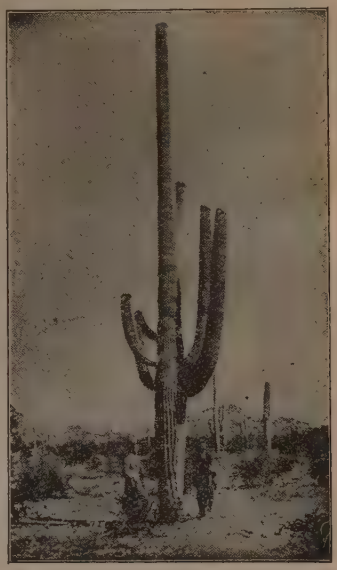


FIG. 23.

Giant cactus in the desert of southwestern Arizona.

Animals eat few of the arid land plants except the grasses, which were once the food of the buffalo, or *bison* (Fig. 26), and are now the support of cattle and sheep (Figs. 114 and 185). The bison, whose home was on the prairies and the arid plains east of the Rocky Mountains, is now gone, and few large animals are left in its place. The graceful antelope and the cowardly prairie wolf, or *coyote*, and the rabbits upon which the latter feeds, are the most abundant (Fig. 22). Among the rabbits is the long-legged jack rabbit, which leaps across the plains with astonishing speed, with its huge ears thrown back so far that they do not retard its progress.

The fierce puma, or mountain lion, still lives among the mountains, and also the ugly cinnamon and grizzly bears (Fig. 22), though the latter are now rare and difficult to find. Deer and elk inhabit the forest-covered mountains of southern Canada and northwestern United States; and among the higher peaks a few mountain goats and sheep still live on the more inaccessible rocky crags (Fig. 22). The sheep have huge horns much prized by hunters.

Plants and Animals of the Tropical Zone. — Contrast the life in the frozen North and the arid West with that in Central America and southern Mexico. In these regions, which are situated in the torrid zone, the temperature is always warm; and the rainfall, especially on the eastern coast, is so heavy that all the conditions are favorable for dense vegetation.

Indeed, the tangle of growth in the forests is so great that it is practically impossible to pass through it without hewing one's way. Besides trees and underbrush, there are quantities of ferns, vines, and flowers, many of which hang from the trees with their roots in the air instead of in the ground. They are able to live in this way on account of the damp air. Among the trees are the valuable rosewood, mahogany, ebony, and rubber tree; and among the flowers are the beautiful orchids. On account of the continual warmth and moisture, many plants, like the banana for instance, bear fruit throughout the year.

In the midst of such luxuriant vegetation, animal life is wonderfully varied and abundant. There are the tapir, monkey, and jaguar (Fig. 24); brilliantly colored birds, such as parrots, paroquets, and humming birds; and millions of insects. Scorpions and centipeds abound, and ants exist in countless numbers, some in the ground, others in decayed vegetation. Serpents, some of them poisonous, are common in the forests; and in the rivers are fish and alligators, the latter being found as far north as Florida and Louisiana.

Plants and Animals in the Temperate Part of North America. — Between the frigid and torrid zones, and both east and west of the arid region, is an area of *moderate* rainfall and temperature where the vegetation and animals differ from those of the other sections. Beginning in the warm south and passing northward, we find that both animals and plants grow less numerous and less varied until, near the Arctic zone, they become scarce and few in kind. The pines and oaks of the United States give place to the spruce, balsam fir, and maple in Canada; then these gradually become stunted and disappear, and beyond this the barrens are reached (p. 21).

The animals that once inhabited the broad temperate zone have been mostly destroyed, although some still live in the forest and mountain region. They are carefully protected by state laws, which prohibit shooting except at certain seasons, and then only in small numbers. When America was first visited by Europeans, these woods abounded in deer, moose, caribou, wolves, and foxes (Fig. 25). Beavers built dams across the streams, the mink and otter fished in the waters, and bears roamed at will. Among the birds, the eagle was very common, and wild pigeons and turkeys were so abundant that they were one of the principal foods of the early settlers.

Some believe that at one time most of the eastern United States was wooded, including the fertile prairies of the Mississippi Valley, from which the trees were burned by fires set by the Indians. Grass then sprang up

FIG. 24.

A few of the animals of the tropical forests.

FIG. 25.

Some of the animals of northeastern United States and southeastern Canada.

in place of the trees, and the prairies became the grazing place for immense herds of bison or buffalo (Fig. 26). The bison, however, like the other animals mentioned, have been mostly destroyed; thousands upon thousands were slaughtered for their hides and tongues only, and their bones left to whiten upon the plains. There are now no wild bison in the United States, except a few which are protected by the government in the Yellowstone National Park. In this Park, where hunting is prohibited, are numbers of deer (Fig. 25) and elk (Fig. 22). There are also black, cinnamon, and grizzly bears, which are so tame that they come down to the hotels at night to feed upon the garbage.

FIG. 26.

One of the immense herds of bison that formerly roamed over the treeless plains.

A slow change has been in progress in this temperate section, which, when first discovered, was clothed in forests and luxuriant prairie grass, and inhabited by Indians and wild beasts. The white man has come into possession of the land and has cleared the forests and plowed the prairies, so that, where trees stood and Indians hunted the bison and other game, there are now fertile farms and thriving cities.

Our crops and domesticated animals well illustrate how man has learned to make use of nature for his needs. Every one of our cultivated plants was once a wild plant; and each of our domesticated animals has been tamed from the wild state. Most of these have come from Europe and Asia; but America has added some to the list. Among plants in common use, the Indian corn or maize, the tobacco, tomato, pumpkin, and potato were unknown to the Old World until America was discovered. The same is true of the turkey; and perhaps, in a hundred years or so, the bison may be included among the domesticated animals, for on the cattle ranches of the West a few small herds are being carefully reared.

Peoples

Eskimos. — America was inhabited for thousands of years before it was discovered by white men. To the natives in the southern part Columbus gave the name *Indians*, supposing he had reached India. Those in the Far North (Fig. F), who subsist on meat, are called Eskimos, a word meaning flesh-eaters.

To-day, in some places, the Eskimos live in very nearly the same condition as formerly, their climate being so severe that white men

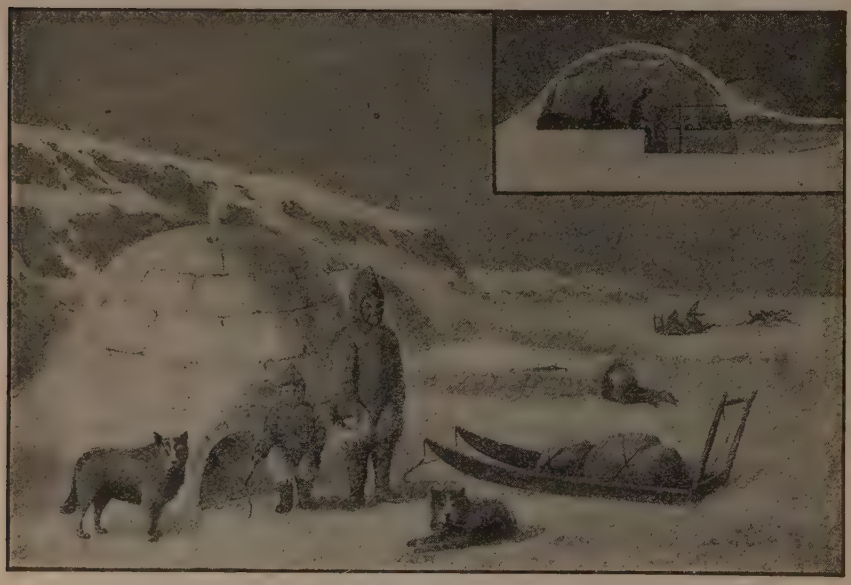


Fig. 27.

Eskimo igloos in Baffin Land.

have not settled among them nor interfered with their customs. They still roam about in summer, living in skin tents, or *tupics*, and in the winter erecting snow and ice huts, or *igloos* (Fig. 27). Their struggle is a hard one, for they not only have to battle against cold, but also to obtain their food amid great difficulties. In this they are aided by their dogs, doubtless domesticated wolves, which, like their masters, are able to subsist upon a meat diet and withstand the severe Arctic cold. Every Eskimo man has his team of dogs to draw his sledge over the frozen sea.

Indians. — Indians were originally scattered over most of the country south of the Arctic Circle. This is indicated by the places

that bear Indian names, as Narragansett, Erie, Niagara, Huron, Ottawa, Illinois, Dakota, Pueblo, and Sioux City. Some of the tribes were true *savages* (Fig. D); others, not so savage, may be classed as *barbarians*. They raised "Indian corn" and tobacco, made pottery, used tools and weapons made of stone, and lived in villages.

In southwestern United States, Mexico, and Central America the aborigines were more civilized. Much of that region is arid; but the Indians raised crops by irrigation, and built fortresses of stone and sun-dried brick (Fig. 28). These were erected partly as homes for protection from surrounding savages, and partly as storehouses for grain.

FIG. 28.

The pueblo of Taos in New Mexico. Notice the ladders leading to the roofs upon which are the house entrances.

The most noted among these Indians were the *Aztecs*, who occupied the city of Mexico and some of the neighboring country. They had government and religion much better developed than the barbarous and savage tribes. They mined gold and silver and manufactured the metals into various articles; they wove blankets, and ornamented their pottery and their buildings in an artistic manner. Living the quiet life of the farmer, the Aztecs preferred peace to war, and a settled home to the nomadic life of the hunter.

While some tribes thus approached a state of civilization, the Indians, as a race, never became a powerful people. For this there are several

reasons. Instead of forming one great confederacy and living at peace with one another, they were divided into many tribes. Each tribe had a certain area over which it could roam and hunt; but if it encroached upon its neighbors, war followed. Under these circumstances it was difficult for one tribe to advance to a much higher state of civilization than the others.

The level nature of the country rendered this difficulty all the greater. Had the surface of North America been very mountainous, some tribes might have been so protected by surrounding mountain walls as to dare to devote themselves to other work than war. Then they might gradually have collected wealth and developed important industries; but the vast plains of the Mississippi Valley, and the extensive plains and low mountains of the East, allowed little protection. If any one tribe had built good homes on these plains, and collected treasures within them, the neighboring Indians would have felt that a special invitation had been extended to attack them. The Aztecs were continually in danger from this cause. However, the fact that they were *partly* protected by mountains and deserts, was one of the reasons why they were more civilized than the Indians of the northeast.

FIG. 29.

Indian woman carrying her baby, or *papoose*.

Another serious obstacle to the advancement of the Indians was the fact that they possessed no domestic animals for use in agriculture. The horse, cow, sheep, goat, and hog were unknown to them; and, without these, farm work becomes the worst drudgery, because every product must be raised by hand.

Again, although there was much game, the supply was never sufficient to support a dense population for a long period. Even the scattered Indian population was obliged to wander about in search of it. This prevented them from living quietly and finding time for improvement. All these facts worked against the advancement of the Indians; but they proved of great advantage to the whites, making it far easier than it would otherwise have been for them to obtain possession of America.

The Spaniards. — The astonishment of Europe was great when it was proved that there were vast territories on this side of the Atlantic. America was pictured as containing all sorts of treasures, and European nations vied with one another in fitting out expeditions to take possession of them.

The Spaniards naturally led, for they were then one of the most powerful nations of Europe and had sent out Columbus as their representative. Leaving Palos in Spain on his first voyage, he was carried southwestward by the winds to one of the West Indies, a point much farther south than Spain itself. Find on a globe the point on our coast that is about as far north as Madrid.

The section reached by the Spaniards had a climate similar to that of their own country, and they easily made themselves at home there and soon came into possession of most of South America, Central America, Mexico, and southwestern United States. They had one advantage over the English and French who settled farther north: the portion of the continent that they discovered is so narrow that they easily crossed it, and thus enjoyed the privilege of exploring the Pacific coast also. It was because of this fact that the Spanish race settled the western coast as far north as San Francisco.

After robbing the Aztecs of immense quantities of gold and silver, the Spanish converted the natives to Christianity, and introduced many Spanish laws and customs. They cruelly mistreated the natives, killing many and enslaving others, and forcing them to work in the mines and fields. While the invaders were able to conquer the semi-civilized Aztecs and the barbarians of the islands, they made very little progress in subduing the more savage tribes. To this day, in fact, there are tribes of Indians in Mexico and Central America that have never been conquered.

The French. — The French began their settlements in a very different quarter, being first attracted to our coast by the excellent fishing on the Newfoundland banks. Soon the fur trade with the Indians proved profitable, and the French took possession of Nova Scotia and the region along the St. Lawrence River and the Great Lakes.

The value of the fur trade, and a desire to convert the Indians to Christianity, led the French far into Wisconsin and to the head waters of the Mississippi River. Making their way southward to the mouth of that river, they took possession of the whole Mississippi Valley (Fig. 30), and called it Louisiana in honor of their great king, Louis XIV. In order to hold this vast territory, they established a chain of trading posts and forts from the Gulf of Mexico to the Gulf of St. Lawrence. One of the most important of these forts stood where Pittsburg now stands.

What special advantage had the French for reaching so much of the interior of the continent? Why should they not have proceeded westward

to the Pacific? Many places in the St. Lawrence and Mississippi valleys still preserve French names, as Lake Champlain, Marquette in Michigan, La Salle in Illinois, St. Louis, and New Orleans.

The English. — The Spanish and French left only a narrow strip along the Atlantic coast for other nations. Among those who attempted settlements were the Dutch in New York and the Swedes in Delaware. But the English, settling at various points along the coast, soon obtained the lead. They captured New York City (then called New Amsterdam) from the Dutch, and extended their settlements along most of the coast from Florida to Nova Scotia.

In several respects the portion that fell to the English seemed much less desirable than that held by the Spanish and French; yet the English-speaking race has managed, not only to retain this, but to add to it most of the possessions of the other two. At the present time, the control of the entire continent, with the exception of Mexico, Central America, and a few small islands, is in the hands of either the United States or Great Britain.

There are, of course, good reasons for this strange result. No doubt original differences between these three races is one cause; but there are others also. In the case of the Spanish, the climate has been one factor; for in a large part of their territory the weather is too warm to produce energetic people. In very cold countries, as in the land of the Eskimos, so much labor is required in merely obtaining food and shelter, that little time and strength are left for general improvement. The struggle is too severe to allow progress.

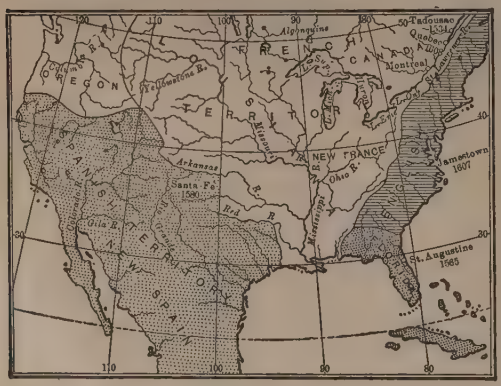


FIG. 30.

Map showing the claims of France, England, and Spain upon the territory of central North America in 1760.

In warm countries, on the other hand, the same effect is produced, but in the opposite way. So *little* energy is required to find sufficient food that the people do not *need* to exert themselves, and hence do not. By taking a few steps, the Central American can find bananas and other nourishing food at almost any season of the year; why then should he work? The people, therefore, lose the inclination to bestir themselves, or, in other words, become too lazy to improve their condition.

Another reason why the Spaniards have not developed is found in their relation to the Indians. Although robbing and enslaving them, they at the same time married them freely, so that, in time, half-breeds have come to make up more than half the population. These half-breeds are an ignorant class, far inferior to the Spaniards themselves, and so backward (Fig. 31) that they still follow many of the customs of the Aztecs.

The French likewise intermarried with the Indians and adopted some of their customs. Their climate was, on the whole, more favorable than that of the Spanish.

As for the English, the temperate climate of their section is the best in the world for the development of energy. The warm summers allowed

FIG. 31.

A primitive Mexican cart with wooden wheels.

abundant harvests; but the long, cold winters forced the settlers to exert themselves to store supplies for the cold season. Since it required only a reasonable amount of labor to obtain the necessities of life, time and energy were still left for improvement.

In their treatment of the Indians, the English and French were less cruel than the Spaniards; but unlike both French and Spanish, the English would not intermarry with savages. Consequently, in the wars with the French, the English were not hampered by great numbers of half-civilized persons, and could act with more intelligence, speed, and force. Their relation to the Indians, however, placed them at a disadvantage in one respect; for, during the fights with the French, a majority of the Indians were enemies of the English.

The fact that the English were hemmed in by forest-covered mountains on the west, and by the French and Spanish on the north and south,

also proved an advantage; for on that account they were kept close together, and were easily able to combine their forces when wars arose.

These are some of the reasons why the English-speaking race has won its way on the continent against both Spanish and French. Spain has steadily lost ground, having given up Porto Rico to the United States and acknowledged the independence of Cuba; and France has had no claim upon the continent since 1803. The Spanish race still occupies Mexico and Central America, while French is even now spoken by many people in New Orleans, Quebec, and Montreal.

Westward Migration. — After the Revolutionary War, by which the Thirteen Colonies gained their independence from Great Britain, an active westward movement began. For a long time the Appalachian Mountains had stemmed the tide of migration (Fig. 32). But at last numbers of pioneers found their way, along the river valleys, to the other side of these mountains. There they discovered fertile plains, free from rocks and woods, and ready for the plow; and their enthusiastic reports quickly drew hundreds of thousands after them.

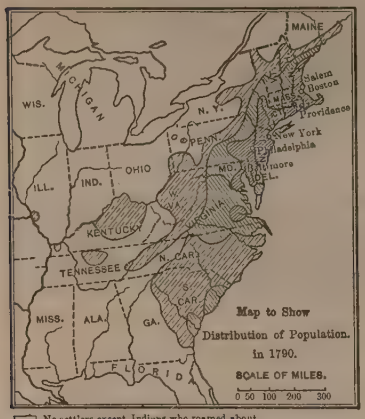


FIG. 32.

Map to show the settled part of the United States in 1790. Notice the cities named; each of these had over 5000 inhabitants. Which are now among the great cities of the country? What about Chicago?

The westward advance pushed the frontier line on and on until the semi-arid plains of the West were reached. Then, in 1848, the discovery of gold in California produced a wave of excitement that carried hosts of adventurers across the Rockies to the Pacific coast. After this the western part of the United States was rapidly explored and settled.

Slavery. — While the Indians of the East were being killed in war and driven westward, negroes were being brought from Africa. There are now fully eight million blacks in the United States, which is nearly one ninth of our entire population, and thirty times the number of Indians.

Slavery was first introduced into America by the Spaniards, who made slaves of the Indians. The first negro slaves in the British colonies were brought to Virginia in 1619. Later they were brought to Massachusetts, New Jersey, and the other northern colonies. The

demand for cheap labor was partly supplied by criminals sent over from England, and by other immigrants who gave their services for a few years in payment for their passage across the sea. Many of these were men and women of good character, who became excellent citizens of a new country.

Negro slaves were brought to all the colonies, but they soon proved a much more profitable investment in the South than in the North. In New England the farms were small, the products were numerous, and their cultivation required considerable skill. Moreover, the climate was severe for natives of tropical Africa. On the other hand, the Southern climate was well suited to them; and the simple routine work upon the great tobacco, cotton, sugar, and rice plantations was such as they could easily perform. Accordingly, the number of negroes increased in the South, while slavery gradually disappeared from the North.

Immigrants to America. — Europe and Asia have poured forth a stream of immigrants into this country. Our increase in population, from a little over three millions at the close of the Revolutionary War to over eighty-four millions at present, has been largely due to this steady stream from abroad. Nearly every foreign nation is represented, and upon the streets of our larger cities may be heard the languages of most of the civilized peoples of the globe.

The greater part of our immigrants have come from northern Europe, especially from the British Isles, Germany, and the Scandinavian peninsula (see Appendix, p. x); and great numbers of them have settled in the cities. More recently a flood of immigration from southern Europe has brought us less educated and less desirable people. At one time many Chinese threatened to come, and laws preventing their coming had to be passed. We have laws, also, excluding paupers, criminals, and laborers who are brought here by contract. To others the country is free.

It has been our mission to welcome these strangers, and, in spite of their varying ideas, customs, and languages, to teach them the principles of a republican form of government, to educate them, and welding them into an harmonious body, to make them good citizens and true Americans. It is not strange if some mistakes have been made in the process. It is a task that no other nation has ever performed on so grand a scale. The fact that so few of the many foreigners who settle among us desire to return to their native lands is proof that they have not been disappointed in their expectations.

REVIEW QUESTIONS. — (1) Of what importance is climate? (2) Why are there no large trees in the cold North? (3) Describe the vegetation there. (4) Tell about the animals that live on the land there. (5) Why are there more animals in the sea? (6) What kinds live there? (7) How do arid land plants protect themselves? (8) Tell what you can about the animals living in the arid lands. (9) Why should there be more life in the tropical zone? (10) Name some of the animals living there. (11) What can you say of the plants of the moist temperate zone? (12) Of the animals? (13) Of the bison? (14) What cultivated plants and domesticated animals has North America supplied?

(15) Describe the difficulties that the Eskimos encounter. (16) Give some examples of Indian names. (17) Describe the life of the different kinds of Indians. (18) What causes prevented the Indians from becoming more civilized? (19) Give a reason why the Aztecs were able to advance. (20) What advantage did their location in southern North America give the Spaniards? (21) How did the Spaniards treat the Indians? (22) What attracted the French to America? Where did they settle? (23) What other nations settled in the East? (24) What has been the fate of the Spaniards and French in America? (25) Why have the English-speaking people come into possession of the greater part of the continent? (26) What interfered with the westward migration of the English? (27) How was this migration finally brought about? (28) Tell about the beginnings of slavery in America. (29) Why was it more successful in the South than in the North? (30) What is our mission toward our immigrants?

For REFERENCES, see *Teacher's Book*.

FIG. F.

Eskimos of Alaska. Notice their clothing, and implements for catching fish.

III. LATITUDE, LONGITUDE, AND STANDARD TIME

Latitude and Longitude

Need of a Means for locating Places. — In your study of geography you have doubtless noticed that it has frequently been necessary to refer to lines upon the earth, such as the Tropic of Cancer, the Equator, the Arctic Circle, etc., in order to locate certain places and the boundaries of the zones. But these lines are far apart, and there are many places between them to which reference must often be made. For instance, suppose we wished to state on what part of the earth London is situated; how could it be done? Of course, by taking a long time, it would be possible to describe just where this city is; but cannot some more convenient way be devised?

The difficulty is much the same as that which arises in a large city, where there are thousands of houses. No one person knows who lives in most of them, and if a stranger were looking for a friend, he might have much trouble in finding him.

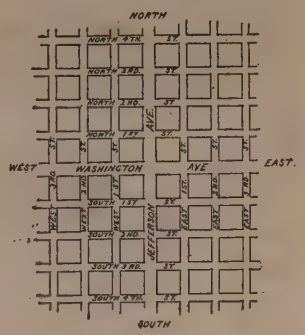


FIG. 33.

Map of a part of a city, to illustrate the need of naming streets.

The Streets of a City. — In this case the problem may be solved in a simple manner. A street running east and west may be selected to divide the city into two parts (Fig. 33). Any place north of this street is spoken of as being on the north side, and south of it as being on the south side. The streets to the north and south are numbered from this, as North 1st, North 2d, North 3d; and South 1st, South 2d, South 3d, and so on. Then if a man says that he lives on North 4th Street, one knows immediately that he lives on the north side, and that his house is on the fourth street from this central one.

But a city also extends a long distance east and west, and we need to know on what part of 4th Street this house is to be found.

To answer that question, another street running north and south, and crossing the east and west ones, may be selected to divide the city into east and west parts. The streets on the two sides are numbered from this one, as East 1st, East 2d, West 1st, West 2d, etc. (Fig. 33).

Then if a man lives on the corner of North 4th and East 3d streets, one knows not only that his home is *north* of a certain line, but *east* of another line. If the blocks, or the space between any two streets, are always the same, it will also be easy to tell the distance from each of the central streets to the house.

This plan is not necessary in small towns and villages, because the people there know one another, and are able to direct strangers easily. Few, if any, cities follow *exactly* the scheme here given; but many have a system of naming or numbering streets somewhat similar to this.

If you live in a large city, perhaps you can tell just how your streets are named or numbered.

Distance North and South of the Equator (*Latitude*). — Places upon a globe are located in much the same manner. For example, the equator, which extends around the earth midway between the poles, corresponds to the dividing street running east and west. The distance between the equator and the poles, on either side, is divided into ninety parts (Fig. 34), corresponding, we might say, to the blocks in a city. These, however, are each about sixty-nine miles wide and are called *degrees*, marked with the sign °.

In making maps people think of a line, or a circle, extending around the earth sixty-nine miles north of the equator, and called a *circle of latitude*. Any point upon it is one degree (1°) north of the equator, or 1° *North Latitude* (abbreviated to N. Lat.). Similar lines are imagined 2°, 3°, and so on up to 90°, or to the north pole.

Since all points on any one of these circles are the same distance from the equator, and from the other circles of latitude, the lines are *parallel;* and on that account they are called *parallels of latitude*. See a globe.

The same plan is followed on the south side, places in that hemisphere being in *South Latitude* (S. Lat.).

If one finds that a certain place is on the 8th, or the 50th, or some other parallel north of the equator, he knows how far it is north of the equator. San Francisco is close to the 38th parallel, Chicago close to the 42d, and St. Paul on the 45th (Figs. 104 and 131). Knowing this, it is easy to see that Chicago is 4°, or about two hundred and seventy-six miles, farther north than San Francisco, while

St. Paul is 3°, or over two hundred miles, farther north than Chicago.

From this it is evident that we can easily find the latitude of a given place by the help of these parallels, for *latitude is the distance north or south of the equator.*

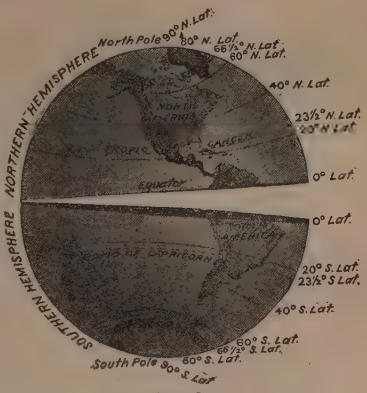


FIG. 34.

The globe, showing the two hemispheres and some of the circles of latitude.

Of course there are no marks *upon the earth* to show where these lines run, but they are of great use *on maps*, because they help us to locate places. Small maps and globes cannot well show the entire ninety parallels on each side of the equator, so that usually only every fifth or tenth one is drawn. Examine some maps (such as Figs. 42 and 104), to see which ones are given. Near what parallel do you live?

East and West Distances on the Earth (*Longitude*[1]). — But how about distance east and west? It is about twenty-five thousand miles around the earth at the equator, and some means must be found for telling on the map how far places are from each other in these directions.

Imaginary lines are used for this purpose, as before; but this time they extend north and south from pole to pole (Fig. 35), and are called *meridians*, or lines of *longitude*. In the case of the city it makes little difference what north and south street is chosen from which to number the others. It is only necessary that a certain one be *agreed upon.*

It is the same with these meridians. No one is especially important, as the equator is, and consequently different nations have selected different lines to start from. In France the meridian extending through Paris is chosen, in England that through Greenwich near London, and in America the one passing through Washington is sometimes used. But it is important that all people agree on some one, so that all maps may be made alike. On that account many countries start their numbering with the meridian which passes through Greenwich. The maps in this book follow that plan.

[1] The ancients thought that the world extended farther in an east and west than in a north and south direction. Therefore they called the east and west, or *long* direction, longitude; the north and south direction, latitude.

In Greenwich is a building, called an observatory, in which there is a telescope for the study of the sun, moon, and stars. As these heavenly bodies are of great help in finding the latitude and longitude of places, Greenwich seemed to the English a fitting place from which to begin numbering their meridians.

FIG. 35.

The earth, cut in halves along the Greenwich meridian, showing some of the meridians. The meridian 20° is usually considered the dividing line between the eastern and western hemispheres.

Commencing with this meridian as 0° longitude, people measure off degrees both east and west of it, and think of lines as extending north and south toward the poles, as they do of circles of latitude running parallel to the equator. Thus there is a meridian 1° west, another 2°, a third 3°, etc. Going eastward, they number 1°, 2°, 3° in the same way.

Any place on the 3d meridian west of Greenwich is said to be in 3° *West Longitude* (W. Long.); if on the 60th meridian, 60° W. Long. Any place on the 20th meridian *east* of Greenwich is in 20° *East Longitude* (E. Long.). New York is 74° W. Long., while San Francisco is about 123° W. Long.

The 180th meridian is a continuation, on the other side of the earth, of the Greenwich or zero meridian (Fig. 36), and the two together make a complete circle. Hence we may speak of *circles of longitude* as well as circles of latitude. Why must the meridian marked 180° E. Long. be the same as the one marked 180° W. Long.? Which meridian passes near New York? Denver?

FIG. 36.

A view looking down on the north pole, to show how the meridians come to a point at the north pole. Notice that if the 0° meridian were continued it would unite with the meridian 180°.

If a large map is made of a small part of the earth, the circles of latitude and longitude are too far apart to be of much use. Therefore, it is customary to divide each degree into sixty parts called *minutes*, just as each hour is divided into sixty parts. Each minute of latitude and longitude is divided into sixty parts called

seconds, as each minute of time is divided into sixty seconds. The sign for a degree is °; for a minute ′; for a second ″. Thus 60 degrees, 40 minutes, and 20 seconds north latitude is marked 60° 40′ 20″ N. Lat. Examine some wall-map of a small section to find these signs.

Knowing the latitude and longitude of any place, it can, by the aid of a map, be as easily located as a house in a great city. For instance, Denver is about 40° N. Lat. and 105° W. Long. It is therefore far to the north and west of New Orleans, which is about 30° N. Lat. and 90° W. Long.

Find the latitude and longitude of some of the large cities on the map (Fig. 44). Notice also that only every fifth meridian is marked. Compare this with the map of New England (Fig. 47). Since this map represents a smaller section, more meridians can be drawn upon it.

The circles of latitude are parallel tc the equator and to each other, as you can prove by measuring the distance between them on a globe. But the meridians cannot be parallel on a globe, since they start from the poles and spread farther and farther apart until the equator is reached. Examine some of the maps in this book to see that the meridians are not parallel, while the lines of latitude are.

You can see how this is by taking the peeling from an orange (Fig. 37). The edges of each of the quarters spread far apart in the middle, or equator, but come together at the ends, or poles, of the orange.

Fig. 37.

An orange with a part of the peeling removed to show how the lines converge toward the poles, as the meridians converge on the globe.

A degree of longitude is a little over sixty-nine miles at the equator; but it decreases more and more as the poles are approached, until at the poles it is nothing, because all the meridians meet there at one point. Examine Figure 36 or, better still, a globe, to see that this must be true.

How a degree of latitude happens to be slightly more than 69 miles is easily understood. The length of a circle extending around the earth through the poles is about 25,000 miles; and this distance is thought of as being divided into 360 equal parts or degrees, that being a number that is exactly divisible by 2, 3, 4, 5, 6, 8, 9, and still other numbers. Divide 25,000 by 360.

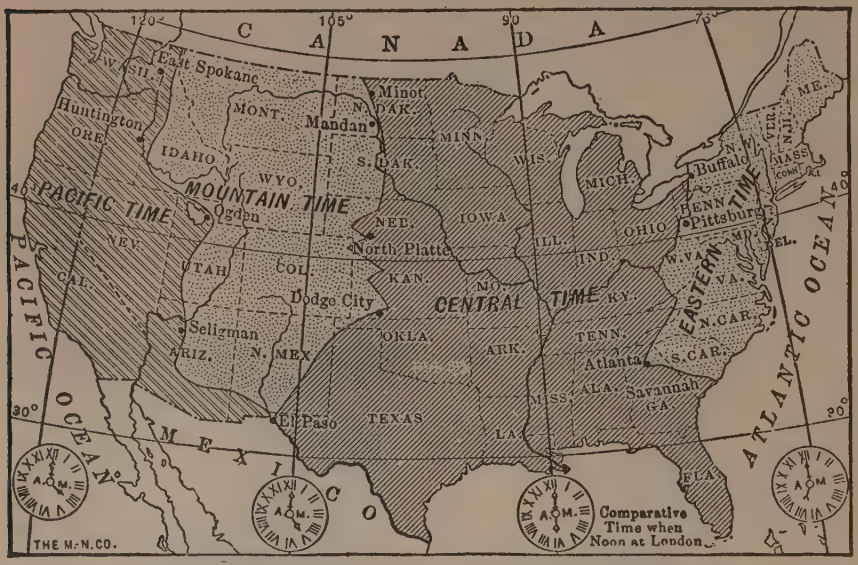
Keeping in mind the number 360, you can understand why the distance from the equator to either pole is 90°, for that is one fourth of the entire distance. How many miles in 90°?

You can now find the width of the five zones (Fig. 244). The tropi-

cal zone is bounded on the north by the Tropic of Cancer and on the south by the Tropic of Capricorn, each of which is $23\frac{1}{2}°$ from the equator. The Arctic and Antarctic circles are likewise $23\frac{1}{2}°$ from the poles. Give the width of each of the zones in degrees of latitude. In miles. What is the greatest width of the United States in degrees of latitude? In miles? How far is the southern extremity of Florida from the Tropic of Cancer? How far is New Orleans from that tropic?

Standard Time

If you were to travel from New York to San Francisco, you would find on arriving that your watch was three hours too fast. The reason is that the rotation of the earth, from west to east, causes the sun's



STANDARD TIME IN THE UNITED STATES.

FIG. 38.

To show the standard time belts of the United States.

rays to fall upon the Atlantic coast more than three hours sooner than upon the Pacific, so that when it is noon in New York, it is about nine o'clock in the morning at San Francisco.

Measuring from east to west, every place has a different time by the sun, and some years ago each city had its own *sun* or *solar* time. But when railways were built, connecting many places, these differences became a source of constant annoyance to the traveler, for his watch showed the time of only one place.

In order to avoid this trouble our continent has been divided into belts, in each of which the railways, and most of the towns, have the same time. Since this time is the *standard for all*, these belts are called the *Standard Time Belts*. The *Colonial Belt* includes the provinces of Eastern Canada; that next west of it, which includes New England, New York, and some of the other Eastern States, is called the *Eastern Time Belt*. What are the others? (Fig. 38.)

In traveling across the country from New York to San Francisco, one starts with his watch set at the standard time for the Eastern Time Belt. After a while he comes to a place where the time changes one full hour; then he has Central Time. Going still farther west to the Mountain Belt, the watch is again set back one full hour; what is done when the Pacific Belt is reached? In this way, only a few changes of the watch have to be made.

Our study of longitude helps us to understand what determines the places for changing this time. When it is noon at a certain point on a meridian, it is noon at every other point on that meridian.[1]

The earth makes one complete rotation every 24 hours, so that the sun reaches each of the 360 meridians in the course of the day of 24 hours. Dividing 360 by 24 gives 15; that is the number of meridians that the sun passes over in a single hour. Therefore, if in one place, as at Philadelphia, on the 75th meridian, it is noon, it will be noon one hour later at all points just 15° west of this, or on the 90th meridian.

This explains what has determined the boundary lines of the time belts. The time selected for the Eastern Belt is that of the 75th meridian; for the Central Belt, that of the 90th meridian, which is just one hour later. What meridian is selected for the Mountain Belt? (Fig. 38.) For the Pacific Belt? Each of these meridians runs through the *middle* of the belt whose time it fixes, so that the eastern boundary of the Central Time Belt is halfway between the 75th and 90th meridians, that is West Longitude $82\frac{1}{2}°$; and the western boundary is halfway between the 90th and 105th meridians, or $97\frac{1}{2}°$ West Longitude.

In reality the railways do not change their time *exactly* according to these boundaries, for oftentimes the meridians extend through very unim-

[1] It is understood, of course, that this does not apply to the frigid zone, where the sun does not rise at all during a part of the year, and where it does not set during another part of the year.

FIG. 40.

These pictures illustrate lumbering. The upper picture shows logging camp. The lower picture shows logs being drawn to the frozen stream.

FIG. 41.

St. Johnsbury, Vt. A typical view in hilly New England, showing the irregular topography and the large percentage of wooded surface.

FIG. 43.

Physiographic map of the United States, giving the names of the principal mountains, plateaus, and plains.

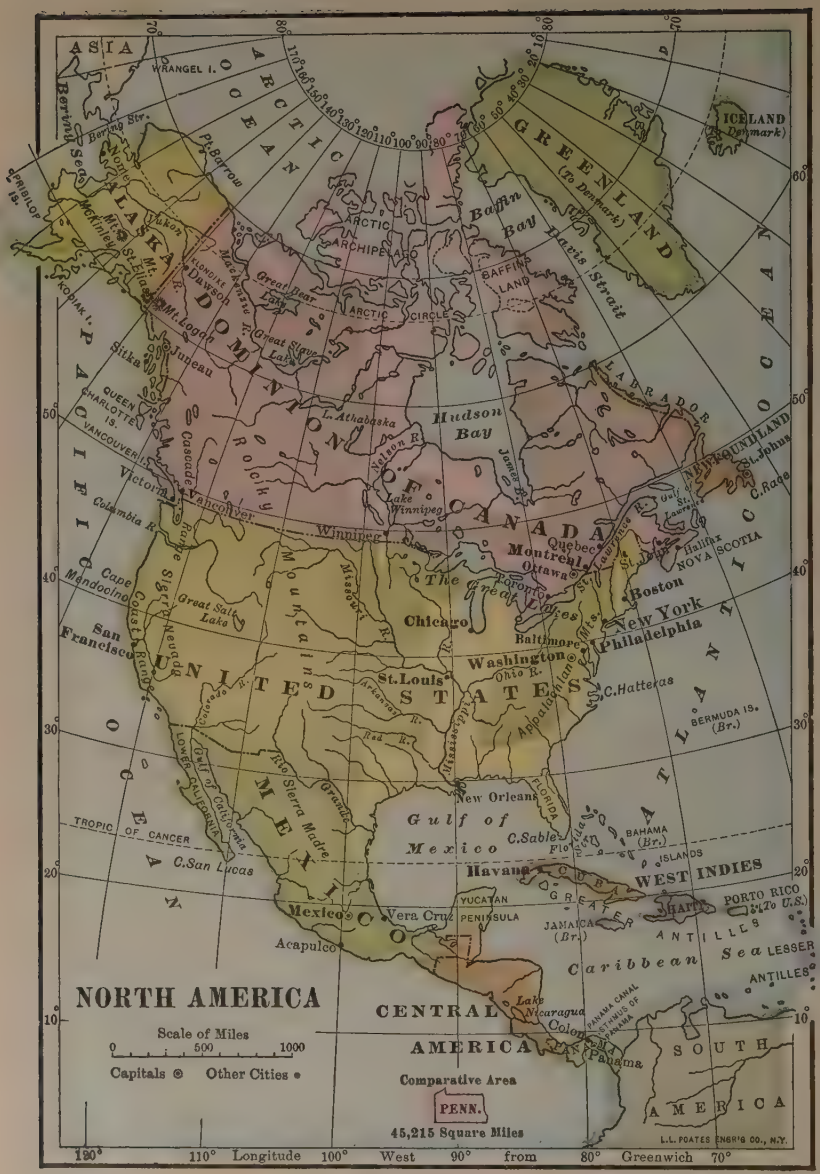


FIG. 42.

MAP QUESTIONS. — This map and the relief map (Fig. 10) show the great Western highlands, the lower highland region of the East, and the great trough between. What are the names of the large rivers that drain the different sections? In which direction does each flow, and into what waters does each empty? In what part are most of the lakes found? Why? Name and locate each of the large peninsulas, islands, bays, gulfs, and seas. Draw an outline map of the continent. Upon it locate the large cities.

FIG. 45.

Relief Map of the United States. Study this map carefully to see the areas of plains, plateaus, and mountains. What is the name of each division? (FIG. 43.) On a sketch map of the United States write the names of the different physiographic divisions in their proper places (as in Fig. 43). Could you not make a sand or clay model of the United States, showing, in a general way, the greater highlands and lowlands?

UNITED STATES
WESTERN SECTION
Scale of Miles
0 50 100 200 300
Capitals of Countries
Capitals of States
Other Cities
Longitude West from Greenwich
125° 120° 115° 110° 105° 100° 95°
50° 45° 40° 35° 30° 25°
DOMINION OF CANADA
Vancouver
Victoria
Seattle
Tacoma
Olympia
Mt. Rainier
Spokane
Portland
Columbia R.
Mt. Hood
Salem
Cascade Range
Sierra Nevada
WASHINGTON
OREGON
IDAHO
Boise
Helena
Butte
Missouri R.
Yellowstone
Rocky Mts.
MONTANA
YELLOWSTONE NATIONAL PARK
WYOMING
Great Salt Lake
Ogden
Salt Lake City
Wasatch Mts.
NEVADA
Virginia
Carson City
Truckee Valley
Mt. Shasta
C. Mendocino
Sacramento
San Francisco
Coast Range
Tulare L.
Mt. Whitney
Pt. Conception
Los Angeles
San Diego
UTAH
Grand Jc.
Denver
Leadville
Pikes Peak
Pueblo
COLORADO
Arkansas R.
Cheyenne
NEBRASKA
Omaha
Lincoln
Platte R.
Missouri R.
Kansas City
Topeka
KANSAS
Grand Canyon
Colorado R.
San Francisco Mts.
Santa Fé
ARIZONA
Albuquerque
NEW MEXICO
Phenix
Gila R.
Tucson
Canadian R.
Guthrie
OKLAHOMA
Red R.
Arkansas R.
MISSOURI
ARK.
Dallas
Brazos
Pecos R.
TEXAS
Austin
Houston
San Antonio
Galveston
Rio Grande
Gulf of California
LOWER CALIFORNIA
MEXICO
GULF OF MEXICO
Lake of the Woods
Winnipeg
Regina
Red R.
Minneapolis
Pierre
Deadwood
Black Hills
Fargo
Bismarck
MINN.
SOUTH DAKOTA
Sioux Falls
Sioux City
IOWA
Missouri R.
LA.
Sabine R.
L. L. POATES ENGR'S CO., N.Y.

FIG. 44.

UNITED STATES
EASTERN SECTION
Scale of Miles
0 50 100 200 300
Capitals of Countries
Capitals of States
Other Cities
DOMINION OF CANADA
Winnipeg
Lake of the Woods
Quebec
Fredericton
Montreal
Ottawa
Portland
Augusta
Boston
Concord
Providence
New York
Buffalo
Toronto
Detroit
Chicago
Milwaukee
Minneapolis
St. Paul
Duluth
Sault Ste. Marie
Pierre
Sioux Falls
Sioux City
Omaha
Des Moines
Kansas City
St. Louis
Topeka
Jefferson City
Springfield
Peoria
Fort Wayne
Toledo
Cleveland
Pittsburg
Harrisburg
Philadelphia
Baltimore
Washington
Trenton
Camden
Atlantic City
Dover
Annapolis
Cincinnati
Columbus
Indianapolis
Louisville
Frankfort
Charleston
Richmond
Norfolk
Chesapeake Bay
Raleigh
Wilmington
Cape Hatteras
Nashville
Memphis
Chattanooga
Knoxville
Atlanta
Columbia
Charleston
Savannah
Montgomery
Vicksburg
Jackson
Mobile
Tallahassee
Jacksonville
St. Augustine
Little Rock
Fort Smith
Guthrie
Dallas
Austin
Houston
Galveston
San Antonio
New Orleans
Baton Rouge
Tampa
Key West
Havana
Cuba
Bahama Islands
Gulf of Mexico
Atlantic Ocean
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Niagara Falls
Mississippi R.
Missouri R.
Ohio R.
Red R.
Arkansas R.
Tennessee R.
Cumberland R.
Kanawha R.
Potomac R.
Rappahannock R.
Susquehanna R.
Delaware R.
Hudson R.
Connecticut R.
Merrimac R.
Kennebec R.
Penobscot R.
Saguenay R.
St. Lawrence R.
Rio Grande R.
Brazos R.
Red R.
Sabine R.
Alabama R.
Chattahoochee R.
Savannah R.
Pearl R.
Yazoo R.
Kansas
Nebraska
Missouri
Oklahoma
Arkansas
Louisiana
Mississippi
Alabama
Georgia
Florida
Texas
South Carolina
North Carolina
Virginia
West Virginia
Pennsylvania
New York
Maine
Vermont
New Hampshire
Massachusetts
Connecticut
Rhode Island
Delaware
Maryland
New Jersey
Ohio
Indiana
Illinois
Michigan
Wisconsin
Minnesota
Iowa
North Dakota
South Dakota
Ozark Mts.
Adirondack Mts.
Catskill Mts.
Green Mts.
White Mts.
Alleghany Mts.
Blue Ridge Mts.
Mt. Mitchell
Mammoth Cave
Niagara Falls
C. Sable
C. Cod
Long I.
Key West
95° Longitude West 90° from Greenwich 85°
L. L. POATES ENGRG CO., N.Y.

FIG. 44.

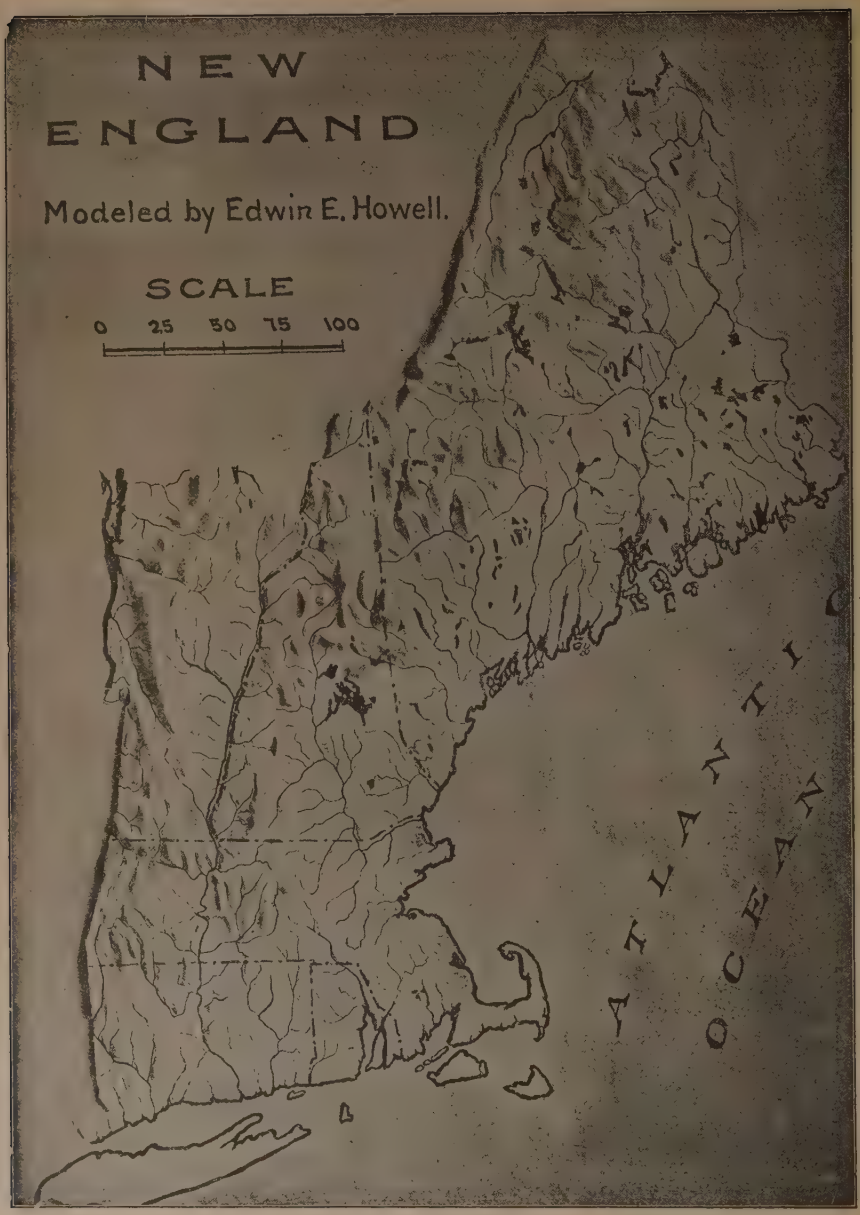


FIG. 46.

Relief map of New England. Describe the relief; (*a*) the location of the mountains, (*b*) the lowlands, (*c*) the lakes, (*d*) the drainage, (*e*) the nature of the coast line.

FIG. 47.

MAP QUESTIONS. — (1) Name the states of this group. (2) What is the capital of each? (3) Where are the mountains? (4) Into what bay does the Penobscot River flow? (5) What large island just east of it? (6) Find three large lakes. In which state is each? (7) Where are the largest cities? Why there? (8) What cape is about twenty-five miles north of Boston? (9) What cape is southeast of Boston? (10) Find Massachusetts Bay. (11) Find Cape Cod Bay. (12) What two large islands lie south of Massachusetts? (13) What two bays near them? (14) What large island lies south of Connecticut? (15) In what state is it? (See Fig. 62.) (16) What waters separate it from Connecticut?

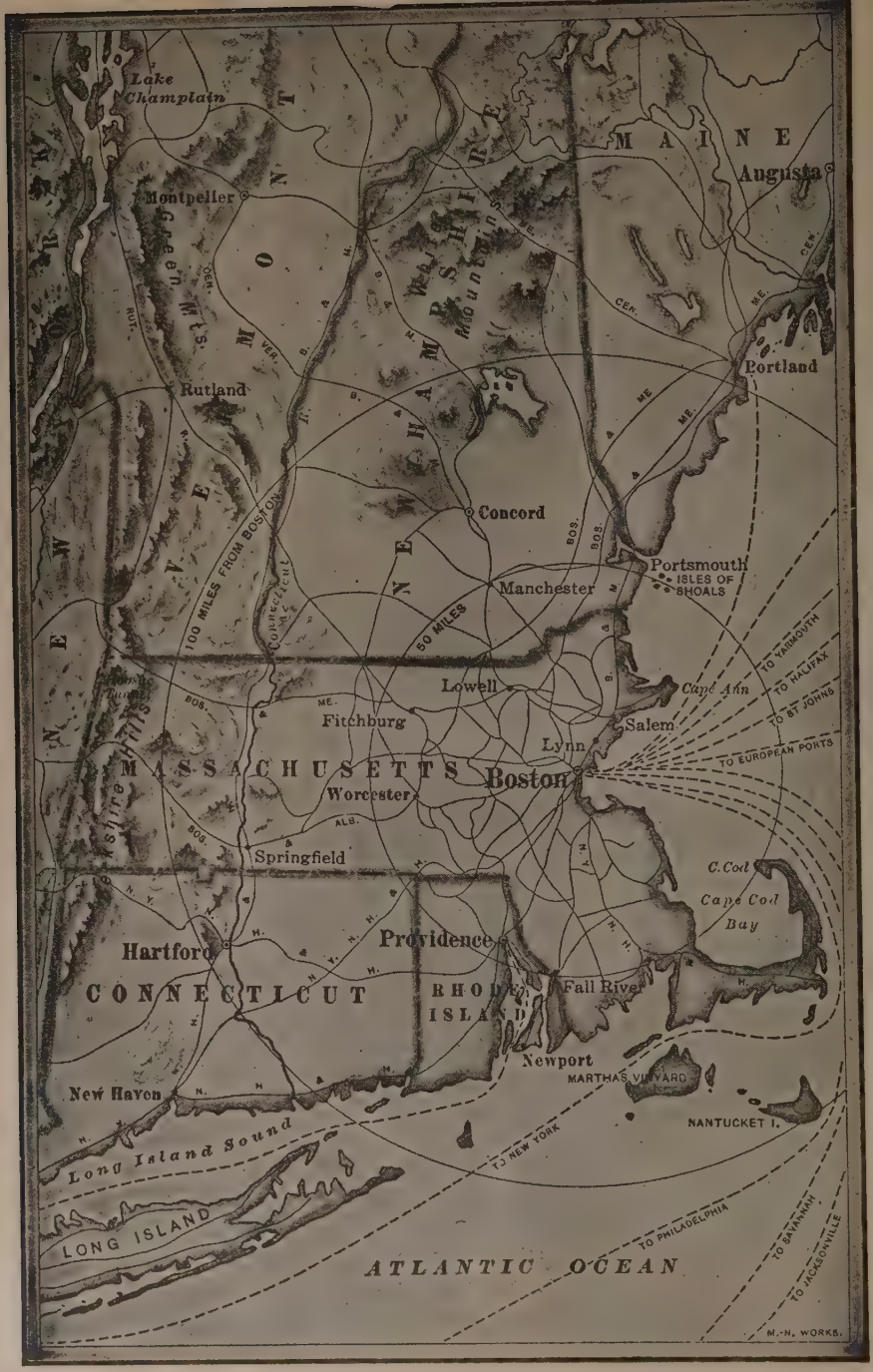


FIG. 48.

Boston and vicinity. Notice the steamship and railway lines converging at Boston. Also the number of cities near Boston.

V. NEW ENGLAND

Physiography and Climate. — Many facts in regard to New England are already familiar from what has been said in Section I. The sinking of the coast has made the shore line extremely irregular, thus forming many fine harbors. The great glacier from the north has left its traces everywhere. By damming the streams and turning them from their courses, it has caused many lakes (Fig. 12), falls, and rapids. The whole surface of the country, with its bare rock ledges and boulder-strewn soil, has resulted from the long-continued action of the glacier. For many years the edge of the ice sheet extended along the southern margin of New England; and the moraine hills and sandy plains that it piled up now cover much of Cape Cod, Martha's Vineyard, Nantucket Island, and Long Island.

While low near the coast, the land rises rapidly toward the north and west, and soon becomes a plateau crossed by river valleys the bottoms of which are several hundred feet below the plateau top. The upland near the coast has been so cut by many valleys that the surface is studded with low hills. But in the west, the higher upland, known as the Berkshire Hills, is quite mountainous.

FIG. 49.

A view across the upland of New England, with Mt. Monadnock rising in the background. Describe this view.

Other mountains, in some cases where the rocks are hard, rise above the plateau. Some of these, like Mt. Monadnock in southern New Hampshire (Fig. 49), rise singly; others, like the White Mountains of New Hampshire (Fig. 50), are in groups; and still

others, such as the Green Mountains of Vermont and the continuation of the White Mountains across northern Maine, form irregular ranges. Many of the mountain peaks reach from three thousand to four thousand feet above sea-level; but Mt. Washington in New Hampshire is more than a mile in height, and Mt. Katahdin in Maine (Fig. 58, p. 64) rises to a height of nearly a mile.

New England is so far north that its climate is cold in the northern part and the snows are heavy. This coldness is increased by a cold current from the Arctic Ocean known as the Labrador current,

Fig. 50. The Presidential Range in winter, from the west.

which makes the east winds cool in summer, and damp and chilly in winter. On the other hand, since a current of warm water from the Gulf of Mexico, called the Gulf Stream (Fig. 264, p. 264), approaches to within a hundred miles of the coast of southern New England, that southern section has warm south winds and little snow in winter.

The Forests

Cutting the Timber. — In the days of the early settlers there was so much forest in New England that lumber was one of the first products sent back to England. Now, where the soil is fertile, most of the woods have been cleared away; but large sections in northern Maine, New Hampshire (Fig. 50), and Vermont, as well as parts of the three southern states, are still covered with timber. Standing on the summit of Mt. Katahdin (Fig. 58), for instance, one sees only a vast wilderness of trees in all directions. The nearest cultivated land is twenty-five miles to the east; but the forests stretch much farther away to the north and west.

Winter is the busy season in this wilderness, for at that time men go into the forests to cut the timber. Lumbering in Maine is an interesting occupation, but it involves so many hardships that a lumberman is said to become an old man after a few years of service.

It is often necessary to work when the temperature is far below zero. The swamps, which are numerous, and in summer almost impassable, are then frozen. At that season, also, the snows have leveled over the boulders and fallen trees so that heavy sleds, loaded with logs, may be drawn through the woods.

Usually fifty men or more are necessary to a logging camp. With axes in hand, they go through the woods, cutting all the trees that are large and sound enough for good lumber. These are cut down, the limbs chopped off, and the logs dragged by horses to the banks of the nearest stream. The men go forth early in the morning and work until late in the evening, eating and sleeping in log cabins. Their beds are broad shelves of rough boards covered with boughs from the spruce and balsam trees, while the one sleeping room is usually warmed by a large stove in its middle.

Floating the Logs to the Mills. — When the snow melts in the spring, the cutting is over and another busy season begins. The logs that are ready are whirled away by the stream current, now swollen by the melting snows; but frequently even this flood of water is not sufficient to carry them. To provide against that difficulty, dams are placed across the streams, or at the outlet of lakes, to store water for use when needed. Immense numbers of logs are floated, or "driven," down stream, forming what the lumbermen call a "log drive."

The work of driving the logs down stream is a very exciting one. Rocks and shoals often check them in their course; and, as soon as one gets caught, others are held back by it, so that, if the jam is not speedily removed, the entire stream may soon become blocked, and all the logs above be prevented from floating down. Such a condition is called a *log jam*, and it is the business of the men to prevent it by keeping the logs moving along in the river, and by freeing any that may become lodged. To do this, they must often wade into the icy water and ride upon the logs. It is common to see a man glide along on a single log, clinging to it by means of the sharp spikes in his boots, balancing himself with a long pole, and jumping from log to log, as a squirrel springs from tree to tree. The men are often wet from head to foot, and sometimes one is thrown into the water and drowned.

Sawmills and Paper-mills. — Some of the logs are stopped near waterfalls far up stream and there sawed into boards, laths, shingles, etc., but most of them are carried as far as the current will take them, even down to the river mouths. These places are natural sites for large towns and cities, because there the logs must be made into lumber for the manufacture of various articles, and all of this requires much work and many men.

Where the current of the Penobscot will carry the logs no farther, that is, where the ocean tide checks the river current, the large city of BANGOR has grown up, since ocean vessels may come to this place to carry off the lumber. The drives of the Kennebec and Androscoggin are stopped at the sawmills in several cities along those rivers, such as WATERVILLE, and AUGUSTA, the capital; but some are carried down as far as BATH, which is noted for its ship building. On the wharves of PORTLAND, the largest city in Maine, are quantities of boards ready to be shipped away to be made into boxes, barrels, doors, and hundreds of other articles.

FIG. 51.
Lumbermen in the Maine woods.

Another important use of forest trees is to make paper, for much of the paper commonly seen — as newspaper and wrapping paper — is now made of wood. Short logs (two-foot lengths) after having the bark removed are placed in a steel inclosure and forced against an enormous grindstone. The *pulp* thus ground off is carried away by water, run through a sieve, deposited on a wide belt, and compressed into thin sheets between rollers. When dry it is paper. One does not often think when reading the news, or wrapping a package, that the paper in his hands may once have been part of a live tree in the forest, perhaps in the woods of Maine. Pulp is also made by help of chemicals.

Paper-mills, some using rags as well as wood pulp, are found at WATERVILLE, GARDINER, WESTBROOK, RUMFORD FALLS, MILLINOCKETT, and other places in Maine. However, HOLYOKE, the greatest paper-making city in New England, is situated in the midst of other busy cities in Massachusetts. At Holyoke the pulp is generally made of rags, which produce a finer grade of paper. The neighboring cities assure a large supply of the necessary rags.

Among the trees in the forests of northern New England is one kind called the *sugar maple*. It is very common in Vermont, although it grows in many other states also, as in New York, Pennsylvania, and Ohio. Its sap, unlike that of most trees, is sweet; and if one bores a hole through the bark in early spring, when this liquid is moving through the trees most rapidly, it will ooze forth. This sap is boiled to drive off some of the water, and maple sirup or maple sugar is the result.

THE ROCKS

There are three kinds of stone that are especially valuable in New England, namely, granite, marble, and slate, each of which is quarried in large quantities.

Granite.—Many of the hills and even mountains, such as Mts. Washington and Katahdin, are almost solely granite; but this is not often quarried, because it is too difficult to draw the heavy stone

FIG. 52.

Marble quarry. Notice the derricks used for handling the heavy blocks of stone. (Md. Geol. Survey.)

from the mountains to places where it is needed. The quarries have generally been located close to cities, or near the sea where the stone may be cheaply sent away by ship. One of the oldest quarries in the country is at QUINCY, near Boston (Fig. 47), and buildings made of Quincy granite over two hundred years ago may still be seen in Boston. Other quarries are found in and near GLOUCESTER, Mass., BARRE, Vt., CONCORD, N.H., and along the coast of Maine.

Beds of stone have seams, called *joints*, extending through them. These aid greatly in quarrying; for, in splitting out large blocks, the quarrymen need only to drill holes, and then, with gunpowder, blast or break the granite from one joint to the next. Smaller pieces are obtained by drilling holes into the large blocks and breaking them apart by driving in wedges.

Much of the granite is used for paving-stones in the city streets, where heavy wagons are constantly passing. For that purpose large blocks are split into halves, these into smaller halves, and so on until the proper size is reached. Other large blocks are loaded into boats at the wharf and carried to Boston, New York, or even as far as New Orleans, where they are used as curbstones, blocks for buildings, and for other purposes. Several of the government buildings at Washington are made of New England granite.

One of the principal uses of granite is for monuments, columns, and other ornamental work. The stone is well suited for this purpose because of its beautiful color, which varies in different quarries, being gray, almost white, bluish, or distinctly red; and most of it will take a high polish.

Marble.—This stone is so much softer than granite that it may be sawed without being blasted. The most noted marble quarries in the United States are near RUTLAND, Vt., where much of the stone is white, though some of it is streaked with blue. In other places, as in Tennessee, the colors are different and often very beautiful.

Marble is too soft for paving-stones, but is much used for buildings, statues, and monuments, the Rutland marble being one of the most common headstones in the cemeteries of the East. Like granite, it may be given a high polish. Some of the most highly prized marble, mostly obtained from foreign countries, is so banded and variegated that, when polished, it makes a beautiful ornamental stone for interiors of cathedrals and public buildings.

White marble has been used for many centuries for making fine statues; in fact, long before the time of Christ, the Greeks built the marble Parthe-

non upon the Acropolis of Athens, and cut marble statues, such as that of the Venus of Milo, which have become famous on account of their marvelous beauty.

Slate. — Slate rock is quarried in several parts of New England, as in eastern Maine and western Massachusetts and Vermont. It is also obtained in Pennsylvania. The value of slate is due largely to the fact that it splits, or cleaves, so easily that it is readily broken into thin slabs with a smooth surface. In this way it is made into roofing slate and school slates; from it also are made slate pencils, slabs for wash-basins, etc.

Fishing

Still another raw product of New England is fish. When the country was first settled, great numbers of various kinds, especially mackerel, halibut, and cod, were found close to the shore. Such names as Cape Cod, Halibut Point, and Bass Rock, given to places on the coast, indicate this. Find the first of these. Provincetown, on Cape Cod, is still engaged in the fishing industry.

Fish supplied the first settlers with one of their chief foods, and the fishing industry soon became of importance. You will remember (p. 33) that it was the fishing which first attracted the French to the American coast; and they still retain the right to fish along the Newfoundland shore.

Near the coast, fish are now much less abundant; but since they are still found farther from the shore, hundreds of vessels and thousands of men are engaged in catching them. Gloucester, which is a center for that industry, is the greatest fishing port in the United States (Fig. 53); but Boston and Portland also have an important fish trade.

Mackerel. — Mackerel are obtained in spring and summer. They

Fig. 53.

A view in Gloucester harbor, showing the fishing schooners, the wharves where the fish are landed, and the buildings in which they are stored.

swim together, and in such numbers — in *schools*, as fishermen say — that they make a great commotion in the water. The fishermen, who are cruising about in search of the fish, sail in swift, two-masted vessels, called *schooners*. When they sight a "school," they spring into their great seine boats, drop a large *seine*, or net, into the water, and endeavor to draw it around the "school." Then the seine is drawn in, forming a pocket and entrapping the fish. In this pocket enough fish are sometimes obtained to fill hundreds of barrels. Some are sold fresh, others are salted and sold as salt mackerel.

Halibut and Codfish. — The method of fishing described above is similar to that which the Disciples of Christ used in the Sea of Galilee. But fishing for halibut and cod is very different. This is carried on

FIG. 54.

Vertical section through a portion of the sea illustrating cod fishing by means of a trawl.

in winter as well as summer, and the vessels go from Gloucester even as far as Greenland and Iceland, although most of them fish on the Fishing Banks off the New England and Newfoundland coasts.

Halibut are very large, often weighing more than a man; and they are often caught upon single lines. Codfish may be captured in the same manner, though a *trawl* (Fig. 54) is more commonly used for cod than for halibut. The trawl consists of a number of hooks hanging from a single long line, all lowered into the water together and left there for hours. The fish bite at the bait on the suspended hooks, and in this way many are caught at one time.

This kind of fishing is dangerous because the men must venture out in small, flat-bottomed boats, called *dories*, to take the fish off the trawls.

While they are busy a storm may arise, or a heavy fog come up, and prevent their return to the vessel. They are then left in open boats far out upon the ocean. Every year dozens of Gloucester fishermen are lost in this manner.

As in the case of mackerel, codfish are sold either fresh or salt. In order to salt, or *cure* them, they are split open and cleaned, soaked in barrels of brine, and then dried upon the wharf. Sometimes the bones are removed, the skin stripped off, and the flesh torn into shreds and packed into boxes as boneless cod. Either the salted or boneless cod may be seen in almost any grocery, and much of it comes from Gloucester.

Other Ocean Foods. — Traps, or *weirs* (Fig. 55), are also set for fish. They are placed along the shore, and many kinds of fish, such as shad, salmon, and bass, swim into them and are then unable to find their way out. *Lobster* fishing is also carried on, especially on the coast of Maine. A lobster trap, made of wood and weighted with stone, is lowered to the

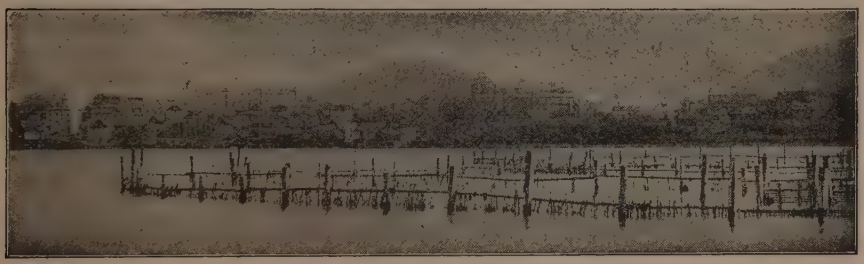


FIG. 55.

A fish weir at Bar Harbor, Maine. The large buildings are summer hotels.

bottom, where the lobster lives, crawling around among the rocks and seaweed. A fish-head for bait is inside the trap, and the lobster crawls in to get it; but he is so stupid that he is rarely able to find his way out.

Clams, found along many parts of the New England coast, live buried in the mud flats which are exposed to view at low tide. At such times boys and men dig these shell fish out, much as a farmer digs potatoes from a hill.

AGRICULTURE

Much of New England is hilly, mountainous, or so strewn with glacial boulders, that farming is not so extensive an industry as in many other parts of the country. By no means all the food that is needed can be raised in this section, much grain and meat having to be brought from the Mississippi Valley and elsewhere. And since the southern portion of New England is thickly dotted with cities, where the people are engaged in other occupations, there is a ready market for whatever food the farmers can supply.

Each farm usually has a small orchard and produces hay and grain which are fed to cattle and horses, or sold near by. All the farmers keep a few hens and sell the chickens and eggs, and some make a business of raising hens, turkeys, and ducks. One of the occupations of the farmers is *truck farming*, which means that various kinds of vegetables, as tomatoes, sweet corn, potatoes, cucumbers, cabbages, and celery, are carefully cultivated, and these, together with milk and eggs, are sent to the nearest town to be sold. The farmer often

FIG. 56.

A view on a Massachusetts farm, showing some fine breeds of milch cows.

takes them himself and sells them from house to house, thus securing higher prices than if he sold them to a storekeeper. Why?

Strangers traveling through New England, upon seeing the hilly surface and rocky soil, are often puzzled to understand how, from such small farms, the owners can earn enough to build such large houses and barns, to furnish their homes so well, and to have so many books and pictures. But the excellent markets in the cities near at hand afford the explanation.

Where the farms are so far away from the cities that it is impossible to drive to them, the profits are less; but special arrangements are made for the marketing of milk. So much of this is needed in the large cities that special cars, carrying nothing but cans of milk, are run from far out in the country. Also a great deal of milk is made into butter and cheese, sometimes on the farm, but much more commonly at factories, or *creameries*, where the work is done by machinery.

In some parts of New England, where the soil is very poor and no market is near, farming has been so unsuccessful that many farms have been abandoned, orchards are grown up with weeds, and houses and barns are tumbling down. This is especially true in the more hilly parts of New England.

Manufacturing

When the Puritans settled New England it was very expensive to bring from over the sea the articles that they needed. Nevertheless, at first they imported not only furniture and tools, but even wood for the interior of houses and bricks for the walls, fireplaces, and chimneys. Even now, in some of the older New England buildings, one sees doors and rafters that came from across the ocean many generations ago.

Very soon, however, the settlers began to make for themselves such articles as shoes, cloth, and lumber. Thus manufacturing began early in this region, and the industry was greatly aided by the water power, caused by the glacier. It was also aided by the many lakes. These serve as reservoirs from which, even during times of drought, a steady supply of water is secured for the falls and rapids.

Fig. 57.

A waterfall that supplies power to some factories in one of the smaller manufacturing towns of New England.

Many mills and factories sprang up near the coast, and later in the interior, and thus New England soon became the principal manufacturing section of the whole country. Its many large cities owe their existence chiefly to this industry. Hundreds of articles are made, those composed of cotton, wool, leather, and metal being the most important.

It may seem strange that this should be the case, since none of these raw materials are extensively produced in New England. But the abundant waterfalls furnished such excellent power that it paid to bring the raw materials there to be manufactured. Therefore chiefly on account of its water power, manufacturing developed in New England; and the people learned the art so well that factories were later built, even where there was no water power. This is true

in BOSTON, for instance, where steam power is used. Nowadays the location of a mill near an important railway, or near some other good shipping point, is a more important matter than its location near water power.

Cotton Manufacturing. — There are about four hundred cotton mills in New England, making such articles as sheets, towels, stockings, underwear, thread, string, handkerchiefs, and gingham and calico dress goods. As many as twelve hundred persons are frequently employed in a single mill. Of this number perhaps three quarters are women, and they may use from sixty thousand to seventy thousand pounds of cotton per day. Most of the cotton is brought from Texas and other Southern States; but some of it comes from Egypt and other foreign countries.

The cotton arrives in bales, weighing about five hundred pounds each, and is made into cloth by machinery in the following manner: First the dirt, small sticks, etc., are removed. Then the cotton fibers of various lengths are combed out straight and well mixed with one another. After that they are pressed into thin, gauze-like sheets. These are gradually drawn and twisted into threads, and then wound upon spindles and taken to the *looms* for weaving.

Cotton cloths are nothing more than such threads woven together, those that extend lengthwise of the piece being called the *warp*, and those across it, the *woof*. An ordinary piece of calico has a warp of perhaps twelve hundred threads, while a wide piece of cloth, such as a sheet for a bed, may contain as many as twenty-five hundred. Stripes are made by coloring the threads differently, and then, before the weaving begins, by carefully arranging them according to some design.

Wool Manufacturing. — Wool is cut, or *sheared*, from sheep, and much of that which is manufactured into cloth in New England is obtained from Ohio and other states farther west. Large quantities are also imported from Australia.

After being sheared from the sheep, the wool is washed and freed from burs, sticks, etc. Then it is untangled and combed out straight, after which it is twisted into yarn, much as cotton is twisted into thread. The yarn is woven into cloth for men's suits and overcoats, and also for cloaks, skirts, underwear, blankets, stockings, carpets, and dozens of other articles. Most, if not all, of the garments that you are wearing are either made of wool or cotton, or of the two mixed together.

The cities extensively engaged in the manufacture of either cotton or woolen cloth, or both, are, in Maine, BIDDEFORD, LEWISTON, AUBURN, and AUGUSTA, the capital; in New Hampshire, MAN-

CHESTER, NASHUA, and DOVER; in Massachusetts, LOWELL and LAWRENCE on the Merrimac River, PITTSFIELD in western Massachusetts, and FALL RIVER, NEW BEDFORD, and TAUNTON in the southern part; in Rhode Island, PAWTUCKET, WOONSOCKET, and PROVIDENCE (Fig. 47), which is the second city in size in New England. One of the largest cotton factories in the world is at MANCHESTER, N.H.

Leather Manufacturing. — Boot and shoe making is carried on in a number of cities, though the most important are LYNN, HAVERHILL, and BROCKTON in Massachusetts. *Leather* is made from the hides of animals, such as cattle, sheep, goats, horses, and hogs. After the hair is removed, the hides are taken to *tanneries*, where they are soaked in a liquid to make them durable.

Some of the tanneries are situated near forests, as in Michigan, where there are many hemlock trees, whose bark produces the tannic acid for tanning. Others are in the mountains of North Carolina, where a kind of oak grows from which tannic acid is made. Some of the tanneries of New England are also near the forest; but many, as those in and about SALEM, are so far away that the bark, as well as the hides, must be brought a long distance to them.

In other tanneries, chemicals are used in place of the tannic acid from hemlock or oak bark. In a single tannery near Boston, where sheep skins are tanned, from thirty thousand to forty thousand skins are used each week.

After being thus prepared, the leather is brought to the shoe factories and cut up, one machine cutting out soles of a certain size, a second tops, a third tongues, etc.; these parts are then sewed or nailed together, and the shoes are soon finished. As in the case of cotton and wool manufacturing, nearly all the work is done by machinery, each person caring for one or more machines and performing the same simple task day after day.

Besides boots and shoes, leather is made into many other articles, as bookbindings, harness, pocketbooks, and bicycle saddles. Can you not name some others?

Metal Manufacturing. — On account of the water power, New England early became engaged in manufacturing metals into various articles; and, although steam now largely takes the place of water, these industries are still very extensive, especially in the three southern states. Since almost no coal and iron are produced in that section, these two materials must be shipped from other states. Therefore, large, heavy objects that require much metal and coal are not usually made.

The lighter articles, as jewelry, clocks, needles, cutlery, tools,

and firearms, that require a high degree of skill, are the chief articles manufactured from metal in New England. For instance, WORCESTER (Fig. 47), near Boston, is noted for its manufacture of wire and iron goods, besides envelopes, boots, and shoes; PROVIDENCE manufactures great quantities of jewelry; NEW HAVEN is noted for hardware and firearms; BRIDGEPORT manufactures carriages, sewing machines, etc.; HARTFORD, at the head of steamboat navigation on the Connecticut River, and SPRINGFIELD, farther north, in Massachusetts, both produce firearms, cars, and bicycles. FITCHBURG is also engaged in metal manufacturing.

Near Boston, at WALTHAM, the American Watch Company has an immense factory where twenty-one hundred watches are made every day. About twenty-four hundred persons, more than half of whom are women, are employed there, receiving $100,000 a month in wages. Great numbers of clocks and watches are made in WATERBURY, and jewelry and cutlery at MERIDEN, Connecticut; and in hundreds of smaller cities, towns, and villages in New England there are factories and mills of various sorts. Also some of the cities occupied in cotton and woolen manufacturing, such as FALL RIVER, LOWELL, and NEW BEDFORD, are engaged in the manufacture of iron and other metals.

LARGEST CITIES AND CHIEF SHIPPING ROUTES

The Large Cities. — All this manufacturing calls for an immense amount of cotton, wool, leather, metals, coal, and food; and most of these products come from outside New England. It is not strange, therefore, that there are many cities on the coast. For instance, PORTLAND (Fig. 47), the largest city in Maine, has an excellent harbor, and is the eastern terminus of the Grand Trunk Railway, which runs through Canada, so that in winter, when the St. Lawrence River is frozen over, it is a shipping point for Canadian goods. NEW HAVEN, the largest city in Connecticut, PROVIDENCE (Fig. 47), the largest in Rhode Island, and BOSTON, the greatest in New England, are all on the seacoast.

The seacoast of New Hampshire is very small, and the largest city, MANCHESTER, engaged in manufacturing, is inland near some falls in the Merrimac River; but on the coast is the important city of PORTSMOUTH. Vermont has *no* seacoast. Its largest city, BURLINGTON, engaged in lumbering and manufacturing, is on Lake Champlain.

Boston and Vicinity. — The most important of all the New England cities is BOSTON, which is fifth in size in the United States. It

is itself a great manufacturing center, being engaged in most of the industries already named, and in making clothing particularly. About it are many large cities and towns in which also are large manufactories (Fig. 48). In addition, these cities serve as places of residence for many of the business men of Boston.

Among these the largest are CAMBRIDGE and SOMERVILLE (Fig. 48), which are extensively engaged in meat packing, machine manufacturing, and printing. Other cities near Boston are represented on Figure 48. Among these are CHELSEA and MALDEN, each of which is engaged in manufacturing rubber goods and other articles. Not far from Boston is SALEM, which in the early days was even more important than Boston. Since its harbor is too shallow for the deep ships of the present time, this city has lost much of its commerce, which is now carried on in Boston. Notice in Figure 32 that Salem was one of the large cities in 1790.

The great size of Boston is due largely to its excellent harbor (Fig. 48) and its central location. Many railway lines reach out from the city toward all parts of the country, while numerous steamship lines connect Boston with all important points along the coast and with foreign countries (Fig. 48).

The port of Boston is second in importance in the United States. Raw materials are sent there in great quantities for distribution among factories, and the finished goods are shipped all over the world. Also much grain and meat for food reach Boston from the West, and from there are distributed among the smaller cities, or shipped to foreign countries. These, in return, send such articles as coffee, tea, and bananas, which are needed in New England.

Boston and vicinity have been important from the beginning of our history. There, at the commencement of the Revolutionary War, occurred the Boston Tea Party, Paul Revere's ride, and the Battle of Bunker Hill. The vicinity of Boston is also noted for its literary associations. Harvard College, the oldest in the United States, was founded in 1636 at CAMBRIDGE, three miles from Boston. Yale College, at NEW HAVEN, Ct., was established sixty-five years later, in 1701. Longfellow, Lowell, Holmes, and Agassiz were professors at Harvard; and Hawthorne, Emerson, Thoreau, and Whittier lived near by.

SUMMER RESORTS

New England is so extensively engaged in manufacturing and other forms of business, that immense numbers of people dwell in cities, where, during most of the year, they are closely confined in noisy factories, or in offices and stores. To these, the wooded mountains, the silvery lakes

(Fig. 12) and rivers, the green valleys, and the rocky seacoast offer such attractions that each summer tens of thousands run away from town for a week, or even for months, to enjoy their vacations at these places.

They go to the green slopes of the beautiful Berkshire Hills and Green Mountains, or climb about among the rugged peaks of the White Mountains to enjoy the magnificent scenery (Fig. 50). Many plunge into the woods of Maine or northern New Hampshire, to hunt and fish, or to canoe upon the streams and lakes. Others settle down at farmhouses to enjoy the quiet of the country (Figs. 49 and 56).

While great numbers visit the woods, mountains, and country, many go to the seashore to escape the heat and to bathe in the salt water, or to

FIG. 58.

Katahdin Lake, Maine. Mt. Katahdin rises in the background.

sail and row. So many go there, in fact, that almost the entire New England coast is dotted with summer cottages and hotels. Thousands visit BAR HARBOR (on Mt. Desert Island in Maine, Fig. 55), which is therefore a very busy place in summer. Nantucket Island and Martha's Vineyard are similar resorts farther south, while NEWPORT, just west of them, on Narragansett Bay, is noted for its many magnificent summer homes.

QUESTIONS AND SUGGESTIONS

REVIEW QUESTIONS. — (1) What effects have the glacier and the sinking of the coast had upon New England? (2) Describe the surface of the country and name the principal mountain ranges. (3) How do ocean currents influence its climate? (4) Describe lumbering in Maine. (5) To what use is lumber put? (6) What cities are noted for it? (7) How are maple sugar and sirup made in

Vermont? (8) State how granite is quarried and what its uses are. (9) State the same about marble and slate. (10) Describe each of the kinds of fishing on the New England coast. (11) Tell about the farming. (12) What led to the early development of manufacturing in New England? (13) What now determines the site of a factory? (14) Describe cotton manufacturing. (15) Wool manufacturing. (16) On the map, locate the cities most extensively engaged in either or both of these. (17) Tell about the tanning of leather. (18) About the manufacture of boots and shoes. (19) Locate the cities most noted for these industries. (20) What can you say about the manufacture of metals? (21) Name and locate the chief cities engaged in it. (22) Give several facts about Boston. (23) What large cities are near it? (24) Where and how do the people take their summer outing? (25) Make a drawing of the New England States, including the chief rivers, cities, and the state boundaries.

Review by States: *Maine* (*Me.*). — (1) Draw the coast line of Maine. (2) What makes it so irregular? (3) Find the principal rivers. (4) What cities are situated on each? (5) Should you expect much fishing along the coast? Why? (6) What reasons can you give why so many people resort to the Maine coast and woods in summer? (7) Describe the lumbering in Maine. (8) What cities are engaged in producing lumber? Why? (9) What stones are quarried in the state? (10) Which is the largest city? How does it compare in size with Boston and Providence? (See Appendix pp. iv–vi.) (11) What other cities in Maine are mentioned in the text? Find them on the map. (12) Draw an outline map of Maine, locating the principal rivers and lakes, the capital, and the chief cities. Do the same for each of the other states as you study about it.

New Hampshire (*N.H.*). — (13) What large lakes are found in this state? What river? (14) Name the cities on it. (15) For what are they important? (16) Why are there not more cities in northern New Hampshire? (17) What industry should you expect there? (18) Find Mt. Washington; it is the highest peak in New England. (19) Where should you expect to find most farming? (20) How does the largest city in the state compare in size with Portland?

Vermont (*Vt.*). — (21) What large lake on the western boundary? Into what waters does it flow? (22) What river on the eastern boundary? Through what states does it pass? (23) What is the name of the mountains? (24) Lumbering is carried on, as in Maine; into what waters must the lumber be floated? (25) What other Vermont industries are mentioned in the text? (26) There is also farming in the fertile valleys and manufacturing, as at Brattleboro. Find Brattleboro. (27) Compare the size of the largest city with that of Manchester, N.H.

Massachusetts (*Mass.*). — (28) Measure the length and width of Massachusetts and compare it with Vermont and Maine. (29) Name the large cities near Boston. (See Fig. 48.) (30) Find Plymouth; for what is it noted? (31) Find the principal cities mentioned in the text and tell where each is located. (32) For what is each important? (33) What advantages do you see in the location of each? (34) Where is the mountainous portion of the state? (35) What effect should you expect the mountains to have upon agriculture? (36) State as clearly as you can the reasons why Boston has grown as it has. (37) Of what importance is Boston to the cities near by? (38) Of what importance are they to Boston?

Rhode Island (*R.I.*). — (39) Measure this and compare its length and width with that of Massachusetts and Maine. It is the smallest state in the Union. (40) What is the name of the bay in this state? What cities are situated on it? (41) What large city is in Rhode Island? (42) Compare its size with Boston

and Portland. (43) Should you expect much lumbering in Rhode Island? Why? (44) Farming? Why?

Connecticut (*Conn.* or *Ct.*). — (45) Where are the mountains in this state? (46) Locate each of the cities mentioned in the text. (47) Tell for what each is important. (48) The farms of Connecticut are better than those of Maine. Give reasons for this. (49) There is almost no lumbering in this state. Why? (50) Compare the size of New Haven with that of Boston and Portland. See Appendix, pp. v and vi.

General. — (51) Name the industries of New England. Tell in which states they are carried on. Which industry do you consider to be the most important? (52) Make a list of the ten largest cities (see Appendix, pp. iv–vii) in New England, the states they are in, and the business they are engaged in.

Suggestions. — (1) Read Whittier's Snow-Bound. (2) Read about lumbering in Chase and Clow's Stories of Industry, Vol. I. (3) Visit a stone yard, or a place where monuments are made, and collect some specimens from the chips in the yard. (4) Find blocks of granite and marble in buildings. (5) Make drawings of mackerel, cod, and halibut. You will find pictures of them in the dictionary. (6) Make a collection of cotton, wool, leather, and metals for the school. Also make a collection of articles manufactured from them. (7) If cotton is worth 7½ cents per pound, how much would the 70,000 pounds, that one mill uses in a day, be worth? (8) What are the average wages per hour of the hands in the Waltham Watch Factory? The working day there is ten hours long. How many watches are made per minute? Per year?

For References to Books and Articles, see *Teacher's Book.*

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Fig. G.

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A New England winter scene. Whittier's birthplace, Haverhill, Mass. (Described in "Snow-Bound.")

VI. MIDDLE ATLANTIC STATES

Physiography. — The Appalachian mountain ranges and plateaus, with their stores of coal and iron, extend across these states from northeast to southwest. Just east of the mountains is a low, hilly plateau of hard rock, called the *Piedmont*[1] *plateau*. This low, hilly region is really a worn-down mountain land like New England; in fact, it represents the very roots of those mountains which rose above the sea long before the Coal Period (p. 2). The land slopes seaward, and the streams flow in short courses in the same direction.

Nearer the seacoast the country is a low plain of softer rocks, chiefly sands and clays, that were deposited on the sea bottom and then raised to form dry land. These plains, added to the country not many ages ago, are known as the *coastal plains* (Fig. 43).

From New York to Alabama the line of division between the Piedmont plateau and the coastal plains is marked by rapids and low falls near where streams cross it, and it is therefore called the *fall line* (Fig. 59). There are rapids and falls at this place because the streams dig more rapidly into the soft layers of the coastal plains than into the harder rocks of the Piedmont plateau.

FIG. 59.

The fall line. Coastal plains dotted, Piedmont and other sections left white. Cities printed in heavy type are located along the fall line.

Since the rapids and falls determine the place where boats passing upstream must stop, and also where there is water power, the earlier settlers located their villages on the fall line, as the Indians had done before them. Note (Fig. 59) how many large cities are on this line. Name them.

Although at first the Appalachians acted as a serious barrier to westward migration (p. 36), at the beginning of the last century

[1] Piedmont means foot of mountain.

FIG. 60.

The Erie Canal and other water routes of New York and vicinity.

FIG. 61.

The locks in the Erie Canal at Lockport.

FIG. 62.

MAP QUESTIONS. — (1) Which states have mountains? (2) Which has none? (3) What influence do you think the mountains have upon the industries? (4) What waters help to form the boundary of this group of states? (5) Find where natural boundaries separate the states. (6) Measure the length and width of this group of states and compare them with the New England States (Fig. 47). Notice that the scale of the two maps is different. (7) Which is the largest state? Is it larger or smaller than Maine? (See Appendix, p. iii.) (8) Name the three bays. Why has a city at the head of one of these bays a better location than one at the entrance? (9) Name the capital of each state. (10) The capital of the United States is in the eastern part of the country. Why? Where would a better location be? (11) Name the five largest rivers. Into what waters do they flow? Through what states?

FIG. 63.

Where are the lakes found? Why in that part?

FIG. H.

The water escaping here is a small portion of that used for power at Niagara Falls. Yet only a very minute portion of the enormous power available is now used.

FIG. 64

A View of Niagara Falls

many emigrants pushed their way across the mountains. This migration was greatly aided by the fact that numerous rivers, such as the Mohawk, Delaware (Fig. 65), Susquehanna, Potomac, and James, flow across a part or the whole of the mountain system. They offered a comparatively easy route across the mountains and therefore formed gateways to the fertile western plains beyond. Trace each of these rivers from its source to its mouth.

FIG. 65.

The Delaware Water Gap, where the Delaware cuts through a mountain ridge.

On the western side of the Appalachians there is a plateau, sloping gently toward the Ohio and Mississippi rivers, called the Appalachian plateau. Near the mountains, in West Virginia and Pennsylvania, the plateau is so deeply cut by rivers, and therefore so rocky, that it would probably have attracted but few settlers had it not been for the rich coal beds inclosed in its strata. The mining of this coal has been greatly aided by the work of the rivers, which have in many cases cut down to the coal beds and brought the coal to light (Fig. 7).

Owing to the fact that the glacier did not spread over the southern part of this group of states (Fig. 9), few lakes and waterfalls are found there. But they abound in New York and northern New Jersey and Pennsylvania, which the glacier did cover. Indeed, on the boundary of New York is the greatest waterfall in America — the famous Niagara (Fig. 64). Two of the Great Lakes are also partly in New York, and a number of other large lakes are within its boundaries. Name some of them. See map, Fig. 62.

In the Middle States, as in New England, the sinking of the land has produced numerous large bays and fine harbors, through which

the tide often reaches far inland. In the Hudson River, for example, the tide extends above Albany, and in the several branches of the Chesapeake Bay it reaches nearly to the fall line.

Most of the coast is low and sandy, with a gradual descent into the sea, so that bathing is excellent (Fig. 66). Because of this fact and the cool sea breezes of summer, the coast is noted for its numerous summer resorts, especially near the large cities.

Climate. — The northern part of New York reaches to the 45th parallel of latitude. How far is that from the equator? From the north pole? How much nearer the equator is the southern part of Virginia? What effect does this have on the crops?

FIG. 66.

A New Jersey beach in summer.

While the climate of the northern portion of this group of states resembles that of New England, the climate of the southern portion is much warmer. Its greater warmth is due partly to the lower latitude, and partly to the ocean currents. The cold Labrador current does not extend south of Cape Cod; but the Gulf Stream passes very near the Virginia coast (Fig. 264, p. 264).

The climate is so mild in Virginia that sleighing and skating are rarely possible, while places near the entrance of Chesapeake Bay — as OLD POINT COMFORT and NEWPORT NEWS — are important winter resorts. Among the mountains, however, the climate is cooler; and even as far south as Virginia and North Carolina there are cool summer resorts on the mountain sides.

Variable winds supply all of these states with thirty or forty inches of rain per year, which is sufficient for crops and for dense forests. Because of its climate and products, the region is well

fitted to support a dense population; and next we shall see where the largest numbers of people are collected, and in what occupations they are engaged.

Forests. — Many of the prominent industries in these states are the same as those of New England. For example, there are extensive forests both in the Adirondack and Appalachian mountains, and upon the Appalachian plateau near their western base. In the southern part, as in West Virginia, many hardwood trees are found; but in the northern portion both the trees and the methods of lumbering resemble those in Maine. WILLIAMSPORT, in Pennsylvania, is extensively engaged in the lumber business, as Bangor is in Maine. There are also many paper mills supplied from the forests, as in WATERTOWN near the Adirondacks.

Over most parts of this section the woods have been so wantonly destroyed that it is now necessary to protect those that are left. New York State has established large forest reservations, and founded a College of Forestry at Cornell University in ITHACA. Besides this, some large tracts of woodland, called *game preserves*, are carefully protected by certain citizens for the purpose of fishing and hunting at the proper season. State laws also protect the game.

Fish and Oysters. — Fishing is a much less important industry than in New England. In the bays many *shad* are caught. This fish swims up the bays and rivers each spring in order to lay its eggs in fresh water, where the young remain until they are large enough to venture to the sea.

Oysters are found from Cape Cod to the Rio Grande (Fig. 232, p. 229); but one of the best localities for them is Chesapeake Bay, where the waters are warm and quiet. From this region they are collected in great quantities. Some are shipped away fresh in the shell, but many are canned, like fruit. BALTIMORE and NORFOLK are especially noted for this industry.

When young, the oysters swim about freely; but after reaching a certain age, they sink to the bottom, fasten themselves to some solid substance, like a stone or an oyster shell, and never move from that spot. They depend for food upon what is brought to their mouths by the incoming and outflowing tides. Oysters prefer comparatively shallow water and can sometimes be picked up by hand from a boat; but usually they must be dragged or *dredged* up with a long-handled rake. Small steamers and sailing boats are used for gathering them. So profitable is the industry that in many places there are private oyster beds, or "plantations," which are carefully protected.

Agriculture

There is more good farm land in these states than in New England, and therefore agriculture is a more important industry. The low, level, coastal plains, the gently undulating Piedmont plateau, and nearly all of New York State, except the Catskill and Adirondack mountains, are dotted with farms. Also in the valleys of the Allegheny plateau, and in the broad valleys between the Appalachian ridges, there is much farming land. In fact, there were farms in the latter valleys even before there were settlers in the prairie states farther west. The numerous large cities call for quantities of vegetables and small fruit, and so there is much truck farming. Virginia raises many early vegetables for northern markets.

Dairying. — Many farmers turn their attention chiefly to dairying; and, although butter and cheese are made in every state in the Union, this work is so important in New York that it is described at this point.

Fig. 67.

A dairy herd in New York, on the way to the barn in the evening.

The number of cows in a dairy herd (Fig. 67) varies from a dozen to several score. In summer they are usually allowed to graze in pastures, but during the winter they are fed in large barns. Twice each day they are milked, and the milk may be sent to a neighboring city to be sold by the quart, as in New England (p. 58), or it may be kept for butter. In the latter case it is placed in a rapidly revolving machine, called a *separator*, which separates the cream from the milk. The cream is then churned until butter is made. The skimmed milk, left after the cream is separated, and the buttermilk, left after the butter is made, are fed to hogs, and used in other ways.

The best cheese is made from fresh milk; but the process is too difficult to be described here. Utica, on the Mohawk River, is an important cheese market; and scattered all over New York are small cheese and butter factories, or *creameries*. These are of

great value to the surrounding farmers, since they furnish a ready market for the milk, some of which is brought to the creameries on trains.

Tobacco. — Among the plants which the early explorers found in America was the tobacco. Much to the astonishment of the Europeans, the savages smoked the dried tobacco leaves in pipes. However, the newcomers quickly learned to smoke also, and tobacco soon became one of the leading products shipped to Europe. Now its use extends throughout the world. So much tobacco is now consumed that, although produced in many countries, tens of thousands of men in the United States alone are employed in raising and preparing it for the market.

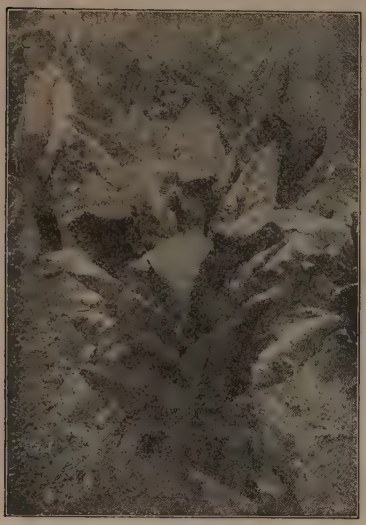


FIG. 68.

The tobacco plant.

The climate of most parts of New England and New York is too severe for this plant; but large quantities are raised in the Connecticut Valley, and in the valleys of southern New York, Pennsylvania, and Ohio (Fig. 216, p. 223). However, the state most noted for its production is Virginia. In the vicinity of LYNCHBURG and DANVILLE, where much tobacco manufacturing is carried on, immense quantities are raised; and RICHMOND and PETERSBURG, on the fall line (Fig. 59), are among the great tobacco markets of the world. Find these cities.

The plant, which grows to a height of about three and a half feet, has thick leaves which are large and broad (Fig. 68), somewhat like those of the pieplant or rhubarb. The leaves, which are the valuable part of the plant, are plucked in the fall, hung in a room to dry, and then made into some form for use.

Fruits and Vegetables. — Both the fertile soil and the climate of these states are well suited to fruit raising. Nearly every farmer raises some fruit. But the sections near water have the best climate for it, because the water causes the air to be cooler in summer and warmer in winter. One of the most noted fruit belts is the

Chautauqua grape belt on the southern shores of Lake Erie in western New York.

Apples form an important fruit crop in New York, being grown in many parts of the state, but especially along the southern shores of Lake Ontario. So much fruit is cultivated in New York that the *nursery business*, or that of raising young fruit trees and bushes to sell, is greatly developed. One of the principal centers for this business is ROCHESTER.

On the coastal plain and Piedmont plateau of eastern New Jersey, Delaware, Maryland, and Virginia, grapes, berries, especially strawberries, apples, and other fruits flourish. Aside from fruit, such common vegetables as potatoes, tomatoes, beans, and sweet corn are raised in all parts of these states.

All of these fruits and vegetables are eaten fresh during the proper season, being used in such quantities that they are sent to the cities on fast trains, and even in special cars. They are prepared for the table in other ways also; for instance, the juice of grapes is made into wine, and that of apples into vinegar.

The *canning* of fruits and vegetables for winter use has become an important industry in several cities, as in BALTIMORE and WILMINGTON. Many farmers are engaged almost entirely in raising fruits and vegetables for this purpose. Probably as many peaches, berries, tomatoes, etc., are put up in cans as are eaten in the fresh state. The tin cans in which they are preserved are to be seen in every grocery store.

Many other crops, such as hay and grain, are raised in the Middle Atlantic States; but a description of these will be given in connection with the states further west, where such crops are produced on a much larger scale (pp. 121–126).

This farming not only supplies food to the residents of the cities, but it also furnishes many of them with *occupation*. The marketmen and grocerymen, for instance, receive a profit when they sell vegetables, whether fresh or canned. The workmen in the flour mills and canneries are also supplied with work by the farmers. Many other factories are established because of farming; for example, the agricultural implement factory at AUBURN, N.Y. (p. 82). Even much of the lumbering and mining is done because the farmers need furniture, plows, etc. Besides this, supplying goods needed by the farmers forms an important part of the business in many cities, like LANCASTER, Penn., which is in the midst of a rich farming country.

Mining

The products from underground are far more important in these states than in New England.

Salt — One of these is salt, a mineral which every person must have. In the early days salt springs were discovered at the point where Syracuse stands, and that city owed its early growth to those springs. Little salt is now produced there; but immense quantities of soda are made of brine obtained from the beds of salt near by.

These beds of salt were deposited in the sea which covered this region before the Coal Period, and were then buried beneath layers of rock. They lie deep down in the earth in the region south of Syracuse and Rochester, and from them salt is obtained at a number of places. In fact, New York produces more salt than any other state. Kansas produces a large amount.

When in the earth, salt is hard, somewhat like coal, and must be obtained in one of two ways. In one case a small hole is bored to it and water allowed to run down and dissolve it; then the brine is pumped up and the water is evaporated by heat until only the salt is left. In the other case, a deep hole, or *shaft*, large enough for men to pass up and down, is dug down to the salt; then lumps of salt are broken off and hoisted to the surface. A salt mine is a beautiful sight with its clear, crystal-white walls and clean floor.

Coal. — Although there is little water power south of the region formerly covered by the glacier, there is coal—an excellent substitute. The coal swamps that existed millions of years ago (p. 2) stretched westward from the ancient Appalachian Mountains beyond the Mississippi River. In some places the coal has been entirely washed away. In others, it is sometimes found close to the surface and sometimes several hundred feet beneath it. Most of this is soft or *bituminous* coal, which is mined in enormous quantities in the neighborhood of Pittsburg and Allegheny.

When the plains and plateaus that contain the coal beds were raised above the sea, they were nearly everywhere lifted without much folding. This was the case in western Pennsylvania, Ohio, Indiana, and Illinois; but mountains were formed in central Pennsylvania, and there the rocks, including the coal beds, were folded. During the long ages that these mountains have been exposed to the weather, the mountain tops have been greatly lowered. Also rivers have carved out deep valleys, and thus most of the coal in that section has been washed away and carried to the sea. In two

or three places, however, as near WILKESBARRE and SCRANTON, beds of hard, or *anthracite*, coal remain. It is to this coal that these cities owe their importance. In that mountain region the coal beds were so deeply folded that neither the weather nor the rivers has been able to remove them; and they remain, therefore, as remnants of much larger beds, preserved because of their protected position.

Anthracite coal was first made in the same way as soft coal. Had it not been subjected to the pressure caused by the mountain folding, it

FIG. 69.

Mouth of a coal mine, Allegany County. (Md. Geol. Survey.)

would doubtless have formed a bituminous coal; but the pressure has changed it by driving off the gases that form a part of all woody matter. These changes have made the coal harder and more difficult to burn; but since it gives forth a more intense heat than bituminous coal and burns with less smoke, it is preferred for some purposes, such as heating and cooking. Throughout New England and many parts of the Middle Atlantic States, anthracite is the only coal used for these purposes.

Most of the anthracite beds lie far below the surface, and deep *shafts* have to be sunk to reach them. From the sides of such a shaft, *tunnels* (Fig. 69) are dug into the beds, and from these the coal is removed. Usu-

ally there are several beds of coal, with thick layers of rock between them, and the shaft extends downward through them all, with tunnels reaching out from it at each level of the mineral (Fig. 70). In a large mine one may travel for days through miles and miles of dark tunnels.

Fig. 70.

Diagram to illustrate how coal is dug out of the beds in tunnels, and raised to the surface through shafts.

The workmen break the coal with the aid of steam drills and picks, and they often furnish their own light by means of lamps fastened to their caps. After the coal is broken loose, it is placed in small cars, drawn to the shaft by mules, or by electricity, and then hoisted to the surface by steam. The mules are kept underground for months, being fed and allowed to sleep in stables cut out of solid coal.

Oil and Gas. — In the plateau along the northwestern border of the Appalachian Mountains, two fuels, oil and gas, are found. *Petroleum*, as the oil is generally called, means "rock oil," a name which suggests its origin.

Ages ago, when these layers of rock were being deposited on the ocean floor, countless numbers of animals and plants, dying and dropping to the bottom, were imprisoned and deeply buried. These plant and animal fossils then slowly decayed, forming oil and gas. Later, the oil and gas were stored in the earth in the pores between the grains of sandstone and other rocks. Very nearly the same kind of oil is now manufactured from fish refuse, and nearly the same kind of gas rises from plants that are decaying in swampy places.

As soon as an opening is made through the rock by boring into it, the gas, which is associated with petroleum, rushes forth, and is conducted away in pipes, often to distant places. Thousands of homes in Buffalo, Pittsburg, and other places are heated with natural gas; and in many factories, too, the gas is used for fuel.

Petroleum also flows out from the borings or *oil wells;* but fre-

quently it must be pumped out. Near the oil wells cities have grown up, such as BRADFORD and OIL CITY in Pennsylvania, and OLEAN in New York. After being taken from the earth, the petroleum is stored in large tanks and then refined (Fig. 71). In its natural state it is a thick, dark yellow or reddish yellow fluid ; but in the refinery it is changed so that the greater part of it becomes clear, colorless, *kerosene* oil. Benzine, naphtha, and gasoline are also made from it. The thick substances left after the refining are used in making dyes of various kinds, machine oil, vaseline, and paraffin.

No region in the world furnishes so much oil as western Pennsylvania, West Virginia, and eastern Ohio. The only section of the world that approaches it is in Russia, near the Caspian Sea. The oil business, which is one of the great industries of the country, is in the hands of the Standard

FIG. 71.

Oil tanks in an oil refinery.

Oil Company, which has absorbed a large number of the small dealers. From the wells the oil is led to the refineries in pipes many miles long, and the company owns immense numbers of special tank cars for carrying the kerosene all over the country, and steamers for shipping it to foreign lands. Watch for one of the tank cars and describe it.

Iron Ore. — Pennsylvania and West Virginia enjoy the advantage of having within their own borders an abundance, not only of coal, but also of oil and gas for fuel. Iron ore is also found in Pennsylvania, Virginia, and other states. Thus both the raw material and

the fuel necessary for manufacturing it into useful articles are found almost side by side. Of course the cities of the neighboring states, such as New York and New Jersey, are also able to obtain these materials.

This is very important, since iron is the most valuable metal for manufacturing that exists. Like coal, this iron ore was prepared long ago, though in a very different manner, as follows. Small quantities of iron exist in many minerals and rocks, the red and yellow colors of many soils being due to it. As water slowly seeps through the rocks it dissolves the iron, much as it would dissolve salt or sugar if those substances were there. In some places, where the conditions have been favorable, the water has brought quantities of the iron to one place and there deposited it, forming beds, or *veins* of iron ore, and it is these that are now being mined.

Sometimes the beds lie very deep, and again they are so near the surface that the iron ore is dug out of great open pits, as stone is taken from quarries. In appearance, iron ore is sometimes a hard, black mineral, sometimes a soft, loose, yellowish or reddish brown earth. It is not iron at all, any more than wheat is flour; it is only the iron ore mineral out of which iron may be made by a great deal of work.

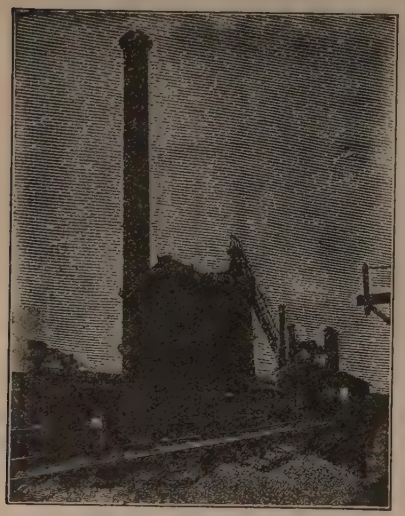


Fig. 72.

Blast furnace.

Iron and Iron Goods. — It is easy to see that one of the principal industries of this section must be connected with iron. Two materials, *coke* and *limestone*, are used with the iron ore to reduce it to the metal. The coke is made from bituminous coal, and the limestone is obtained in quarries.

To obtain coke, coal is placed in stone or brick furnaces, called *coke ovens*, built in such a manner that very little air can reach the coal, which is then set on fire. Many of the gases that form a part of coal are thus either burned up or driven out. One of these gases is the same as that which is used for street lights and for illuminating houses. So little air is let into the ovens that not all substances in the coal are burnt. The part left is the very light, porous coke which can then be burned and made to furnish intense heat, if supplied with plenty of air.

In reducing iron ore to iron, more coke is used than ore, so that

it is an advantage to have the mines of coal and iron ore near each other. The coke, iron ore, and limestone are all placed together in a high, tower-like structure called a *blast furnace* (Fig. 72), so named because a blast of air is forced through it to produce a strong draught while the coke is burning.

Such great heat melts the ore and limestone; and the iron, being heaviest, sinks to the bottom of the fiery hot liquid. The limestone, and those elements of the ore that are not iron, rise to the surface, forming *slag* — a worthless substance that is drawn off through an opening in the furnace and thrown away. Through a lower opening, the iron is run off into trenches made of sand on a sand floor.

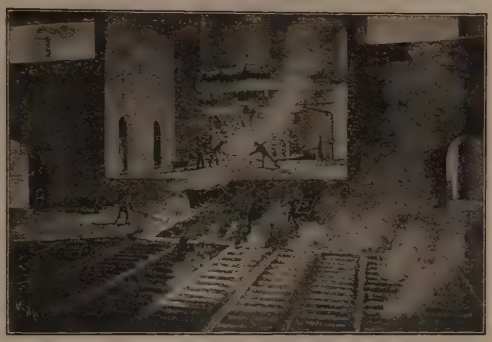


FIG. 73.

Molten iron running out of a blast furnace into trenches, where it cools to form pig iron.

There is one main trench with numerous side branches, and each of these has still smaller branches connected with it, as in Figure 73. When the molten iron cools, the little bars of iron, called *pig iron*, are attached to a larger one. These rough bars, which may be easily lifted, are then broken off and shipped away to be made into thousands of different articles.

Some iron goods, such as stoves and the iron parts of your desk, are nothing more than this pig iron melted and cast, in molds, into the shape that is desired. This is *cast iron*, which is so brittle that it easily breaks under a heavy blow. Other materials, such as knife blades, boiler plates, rails for railways, and watch springs, are made of *steel*. This also is made of pig iron, though after it has been greatly hardened and strengthened by an expensive process.

Wrought iron, a third kind, is used where it is necessary for the metal to bend and yet be tough, as in iron wire.

Almost every city in the Middle Atlantic States is engaged in iron work of some kind, some in making iron and steel out of ore, others in manufacturing iron and steel goods. For example, in New York State, BUFFALO manufactures car wheels, machinery, and many other articles. It has nearly four thousand manufactories, many of them making iron goods; and in NEW YORK CITY almost all kinds of iron goods are made. Iron and steel goods, bicycles,

etc., are manufactured in SYRACUSE; stoves are made in ALBANY and TROY; and there are iron foundries in BINGHAMTON, ELMIRA, and SCHENECTADY.

In Pennsylvania, PHILADELPHIA manufactures steel ships, cars, and hundreds of other iron goods; PITTSBURG and ALLEGHENY make steel and iron goods of nearly every kind; and SCRANTON, READING, HARRISBURG, ERIE, ALTOONA, and a score of other places have furnaces, foundries, and machine shops for iron manufacturing. In New Jersey, JERSEY CITY, NEWARK, CAMDEN, and HOBOKEN manufacture iron goods; in Delaware, WILMINGTON is noted for its cars and steel ships; in Maryland, BALTIMORE, like Philadelphia and New York, has a great variety of iron manufactures. WHEELING in West Virginia and ROANOKE in Virginia are also engaged in iron manufacturing. Almost any article of iron that you might name is made in these cities.

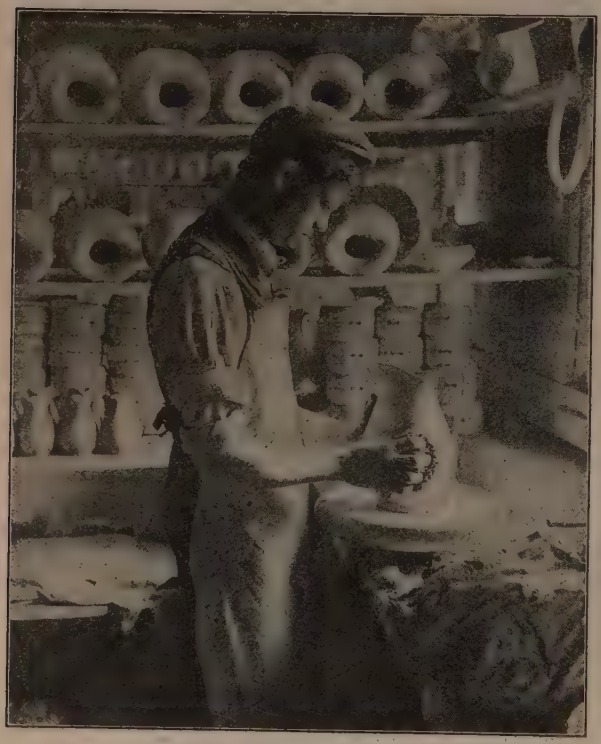


FIG. 74.
A potter's wheel in the works of the Trenton Potteries Company.

The importance of even a single manufactory is proved by the following facts: In 1899, at D. M. Osborne Company's works, AUBURN, N.Y., where farming implements, such as mowers, rakes, reapers, and harrows, are made, over 2700 men are employed, making one complete implement every 40 seconds. Each year these men and their families consume about 9000 barrels of flour, 62,000 bushels of potatoes, 200,000 dozen eggs,

1,400,000 quarts of milk, 375,000 pounds of butter, 1,300,000 pounds of meat, besides much coffee, tea, and sugar. Since they also need to buy clothes, shoes, etc., this one factory, by furnishing the money for all these purchases, helps to support farmers, storekeepers, shoe manufactories, railways, and many other industries; but since it is the farmer who buys the implements, it is he who has caused the factory to be needed. One is really dependent upon the other.

Glass, Pottery, Bricks, etc. — Three other mineral products are especially worthy of note. Glass is manufactured at and near PITTSBURG, WHEELING, and many other places, especially where natural gas furnishes cheap fuel. In the vicinity of the former city are sands which, when melted and mixed with other substances, make an excellent quality of glass. PITTSBURG is the greatest center for plate glass in the country.

In and near TRENTON, N.J., there is a kind of clay which may be manufactured into pottery of a very high grade, and pottery making has become an important industry in that city. To make such earthenware the clay is shaped by skillful workmen into cups, saucers, vases, etc. (Fig. 74), and then baked until it is hard.

So many bricks are used for building, that brick yards are found in the neighborhood of nearly all cities. Bricks are made of clay, which is pressed into the brick shape when damp, then dried, and finally baked. In this process some of the grains melt, so that, when cooled again, they cling together like stone. The clays near PHILADELPHIA, and the great clay beds of the Hudson valley above NEW YORK CITY, supply an abundance of brick for these great cities.

LARGEST CITIES AND CHIEF SHIPPING ROUTES

Location of New York City. — The greatest of all the cities of the United States is New York, which contains about three and a half million inhabitants, and is second only to London among the great cities of the world. There are several other large cities in its immediate vicinity, as JERSEY CITY, NEWARK, ELIZABETH, PATERSON, and HOBOKEN (Fig. 81), all across the Hudson River in New Jersey, but, so far as their business relations are concerned, forming a part of New York City. Before its union with New York, the great city of Brooklyn, on Long Island, was fourth among the cities of the country.

Such a vast collection of people in one section is due chiefly to the excellent harbor and the ease with which goods may be sent westward by water and by rail, making this the principal shipping point in America. More than half of all the foreign trade of the United States is carried on through this port.

The tide reaches up the Hudson above ALBANY, and the Erie Canal extends from there westward to BUFFALO (Fig. 60), on Lake Erie, a distance of 350 miles. From that point one is able to go by way of the lakes to Cleveland, Detroit, Chicago, and Duluth. Thus,

FIG. 75.

Brooklyn Bridge in New York City.

by the aid of this canal, New York City is connected by water with a vast inland territory which is highly productive and thickly populated. By sea New York is connected with different parts of the world, and steamships are constantly entering and leaving its harbor.

Erie Canal. — This canal, which is over 350 miles long, follows the easiest route westward from the Eastern States, the route used by the Indians before the white men came. Since the canal is only seventy feet wide and seven feet deep, all freight coming from the West in lake steamers, and intended for the canal, must be unloaded at BUFFALO, and placed in *canal boats*. These clumsy-looking boats are made with broad, flat bottoms, in order that they may carry heavy loads without sinking deep into the water. They are drawn by horses or mules that walk along the *tow path* at the side.

Since the Erie Canal was completed, in 1825, the cities along its route and on the Hudson River have attained great impor-

tance (Fig. 60). They all have manufacturing industries and use the canal for obtaining such raw materials as coal and iron, and for shipping away the manufactured goods. Notice especially LOCKPORT, situated where there is a very decided slope in the land, neces-

FIG. 76.

Docks at Buffalo in 1828. The city at that time had less than 8000 population.

sitating many *locks* (in which the boats are raised or lowered from one level to another) in the canal; hence the name (Fig. 61). The State of New York is now expending over $100,000,000 in enlarging this canal.

Several other canals have been built in New York, as may be seen in Figure 60: point them out and explain their importance. The smaller lakes and the Hudson River are also made use of as a part of the canal system; but upon these larger bodies of water a number of canal boats is firmly lashed together and taken in tow by a small steamer or tug boat.

Railways of New York. — Canals furnish a very slow method of conveyance; consequently, soon after the use of steam was discovered, men began to build railways. The New York Central Railway, one of the most important in the United States, extends from the very heart of New York City up the Hudson to ALBANY (Fig. 81), where it connects with Boston trains. From ALBANY westward to BUFFALO the route is almost the same as that of the Erie Canal.

Several other railways connect New York with the West, crossing the Appalachians at various points, some passing through BUFFALO, which is a great railway center, as well as an important lake port (Fig. 77). At Buffalo immense quantities of grain, flour, lumber, and iron from the West are transferred from lake vessels to

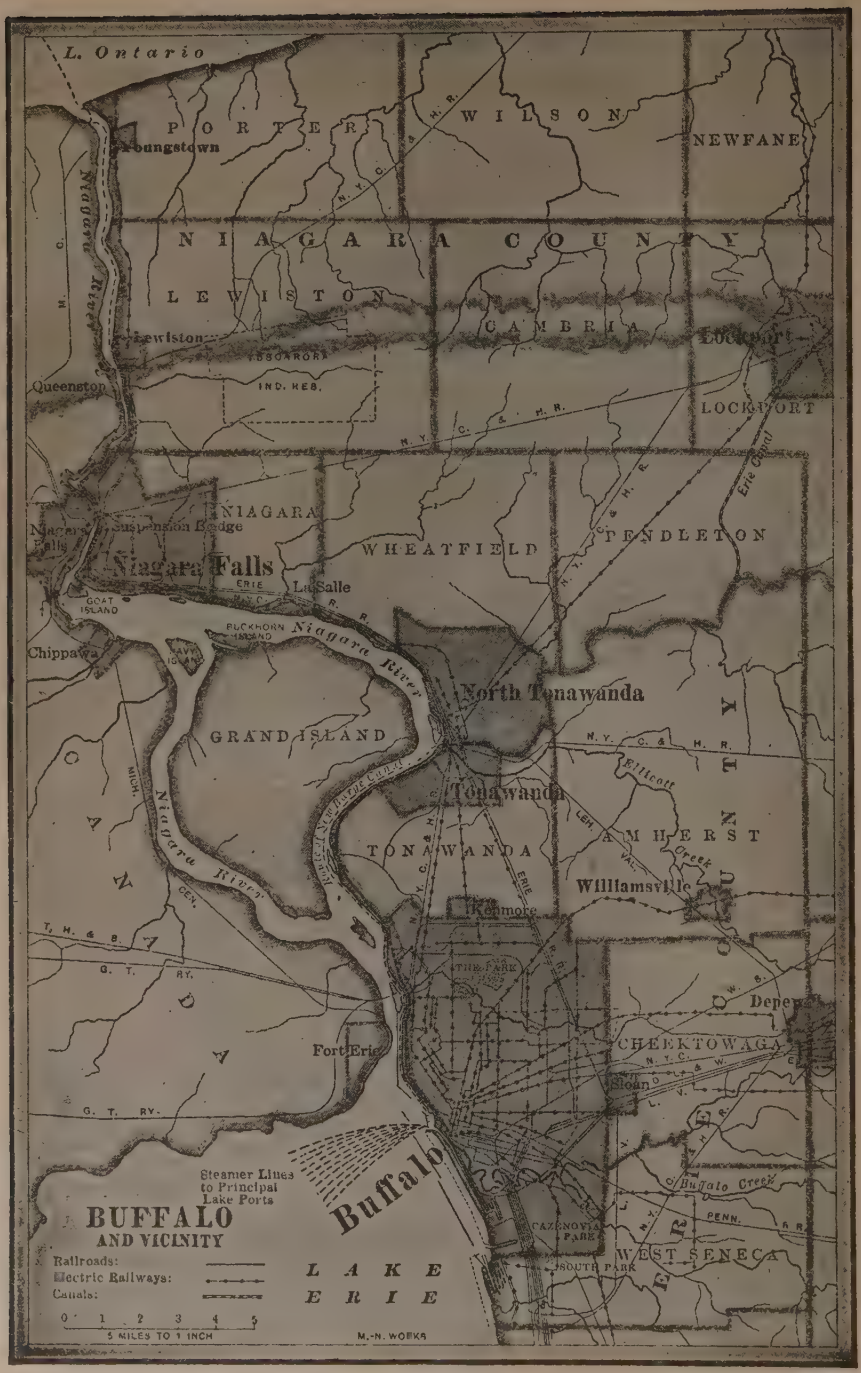


FIG. 77.

Map showing location of Buffalo and vicinity.

canal boats or railways, while coal and manufactured goods are shipped from the East westward.

The Niagara Falls (Fig. 64), about twenty miles away, supply BUFFALO with a great abundance of electric power. All the street cars are run by it, and many factories besides. Electric cars, run by Niagara power, go from BUFFALO to LOCKPORT and to the city of NIAGARA FALLS. The latter place has become an important manufacturing city because of the power furnished by the immense Niagara cataract.

FIG. 78.
A New York ferry.

Since the Hudson River is about a mile in width at its mouth, most of the railways reaching New York from the West and South cannot *enter* the city. They have their terminals just across the river at HOBOKEN or JERSEY CITY in New Jersey. Because of this the latter city is one of the great railway centers of the country. From these points passengers and freight are conveyed across the river in *ferries* (Fig. 78), whole trains often being taken upon one boat.

New York City. — New York City is not only the greatest shipping point in North America, but, together with the neighboring cities, the greatest manufacturing center as well. The place from which goods are most easily shipped in all directions is, for that very reason, one of the best places for manufacturing. Nearly every manufactured article that human beings need is made in or near New York ; but one of the most extensive industries is the manufacture of clothing. Cotton and woolen goods are sent from the New England factories to New York to be made into such articles as dresses, men's suits, and underclothing, and then shipped away. Large buildings, in which hundreds of men and women are employed, are given up to this one work.

Iron and coal are so near at hand that the manufacture of iron goods is another great industry. The refining of petroleum is a third, the oil being led in pipes from the oil fields of western Pennsylvania to great refineries in New Jersey, near the metropolis. The refining of sugar is another immense business in and near New York, as at JERSEY CITY and BROOKLYN ; and there are hundreds of other manufacturing industries. More books, magazines, and newspapers are published in New York than in any other city

in the Union ; and so much wealth is collected there that the New York banks largely control the great business undertakings of all parts of the country.

At the southern end of Manhattan Island, on which much of New York is built, there are about eight square miles of the city given up almost exclusively to the wholesale trade. For the sake of space many of the great office buildings are from eight to thirty-two stories in height. In this part of New York are collected such goods as are manufactured in the city or are brought to it from all parts of the world. Merchants in Denver, Louisville, St. Paul, Galveston, Indianapolis, and other cities, purchase these goods for their stores. In return the Western and Southern people send grain, meat, sugar, etc., to this great city. Thus we daily depend upon one another for our living, even though our homes are far apart.

FIG. 79.

The Park Row Building, New York City. (Copyrighted by Geo. P. Hall & Son, N. Y., 1900.)

The contrast between life in New York City and upon a farm (p. 121) is striking.

Families whose homes are in the city do not usually occupy a whole house; but many live in large buildings, in which hundreds of other people also live. Such a structure, called an apartment building, is commonly from six to eight stories high, and is so arranged that one family occupies only a small part of one floor, or a flat. Other families live above and below, as well as on each side, being separated by only a few inches of brick or boards.

Since land is so valuable, sometimes costing scores of dollars a square foot, there is commonly neither front nor back yard.

In the poorer sections of the city, the people are even more densely crowded. Some of the children have never seen the country, and scarcely

any birds, trees, or grass, except possibly in one of the city parks. In these sections there are many foreigners from all the nations of the earth.

To escape the necessity of living in crowded city homes, tens of thousands of men have their dwellings in suburban towns or country homes, from ten to forty miles from their places of business. They spend from one to three hours daily traveling back and forth. A part of the time they ride upon elevated railways that are built in the street, two, three, and four stories above the ground, and supported by iron columns (Fig. 80).

How different all this is from the country, where only two or three houses are to be seen at a time! Where sunlight and fresh air enter one's home from all sides of the building! Where there is plenty of room to play, with green grass, large trees, and singing birds in the yard! No wonder that people living in great cities are anxious to visit the country, the mountains, the lakes, and the seashore, during a few weeks in the summer.

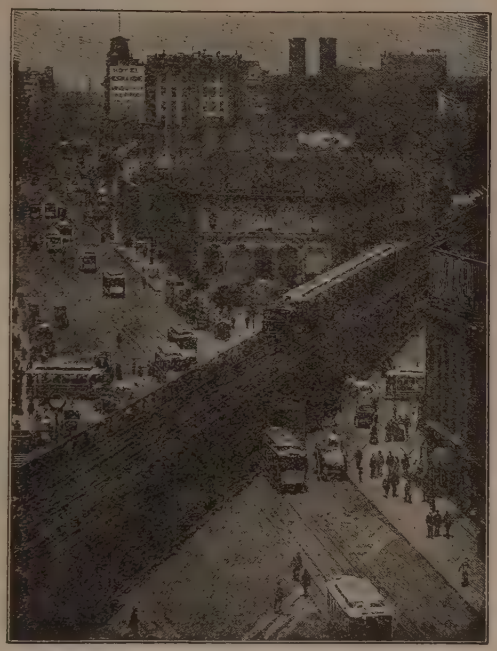


FIG. 80.

An elevated railway in New York.

Largely owing to the enormous population of New York City, with its immense manufacturing interests and great wealth, New York is called the Empire State, ranking first in the Union in population, manufacturing, commerce, and wealth (Figs. 206 and 236).

New York State is prominent for its educational institutions also. In New York City is Columbia University; and at Ithaca, on Lake Cayuga, in the central part of the state, is Cornell University. Both of these should be associated with Princeton University in New Jersey, and Harvard and Yale universities in New England, as among the most important educational institutions in the country. In Virginia is the very old and well-known University of Virginia. Besides this, north of New York City, on the Hudson River, is West Point, the place where the govern-

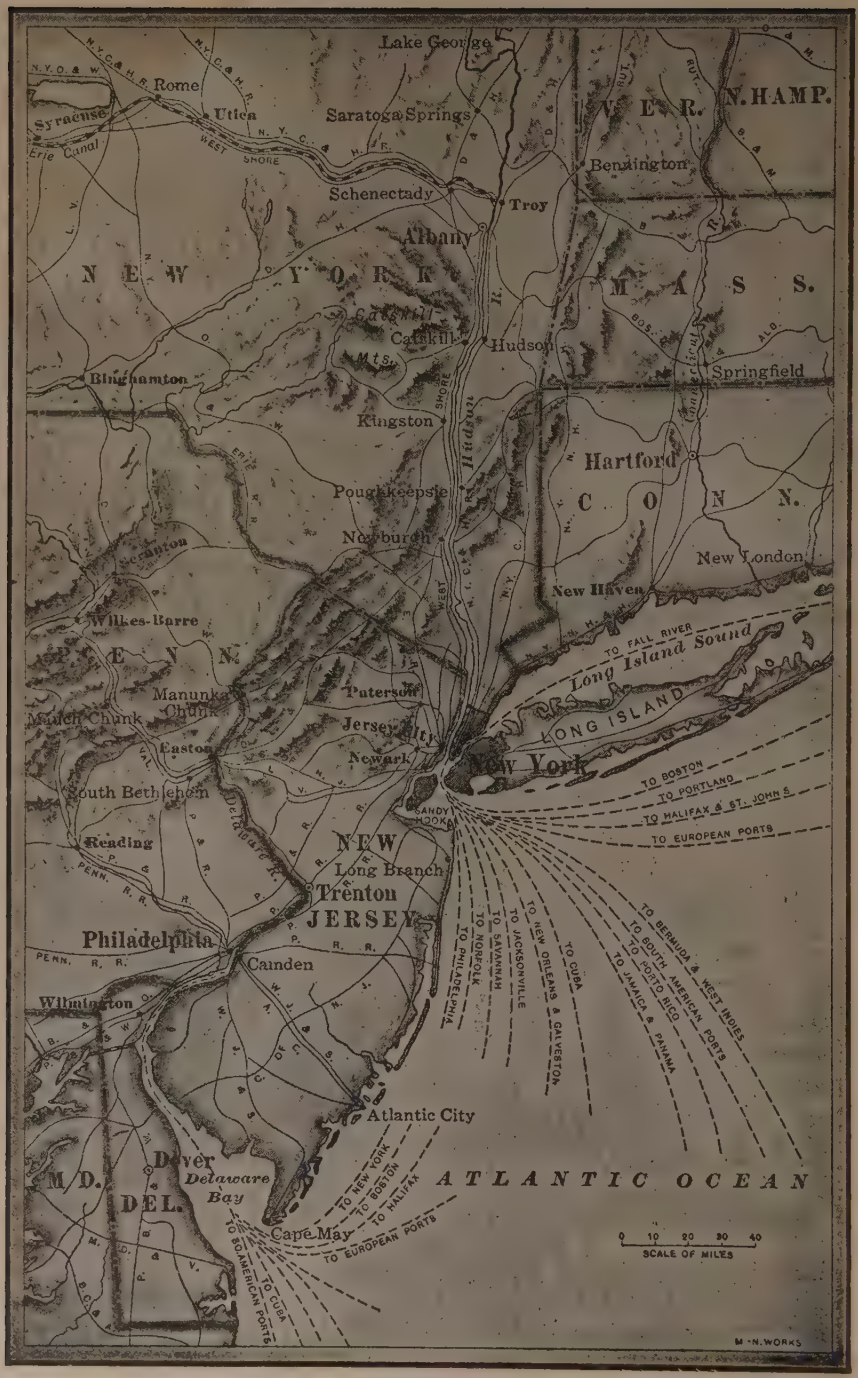


FIG. 81.

New York City and vicinity

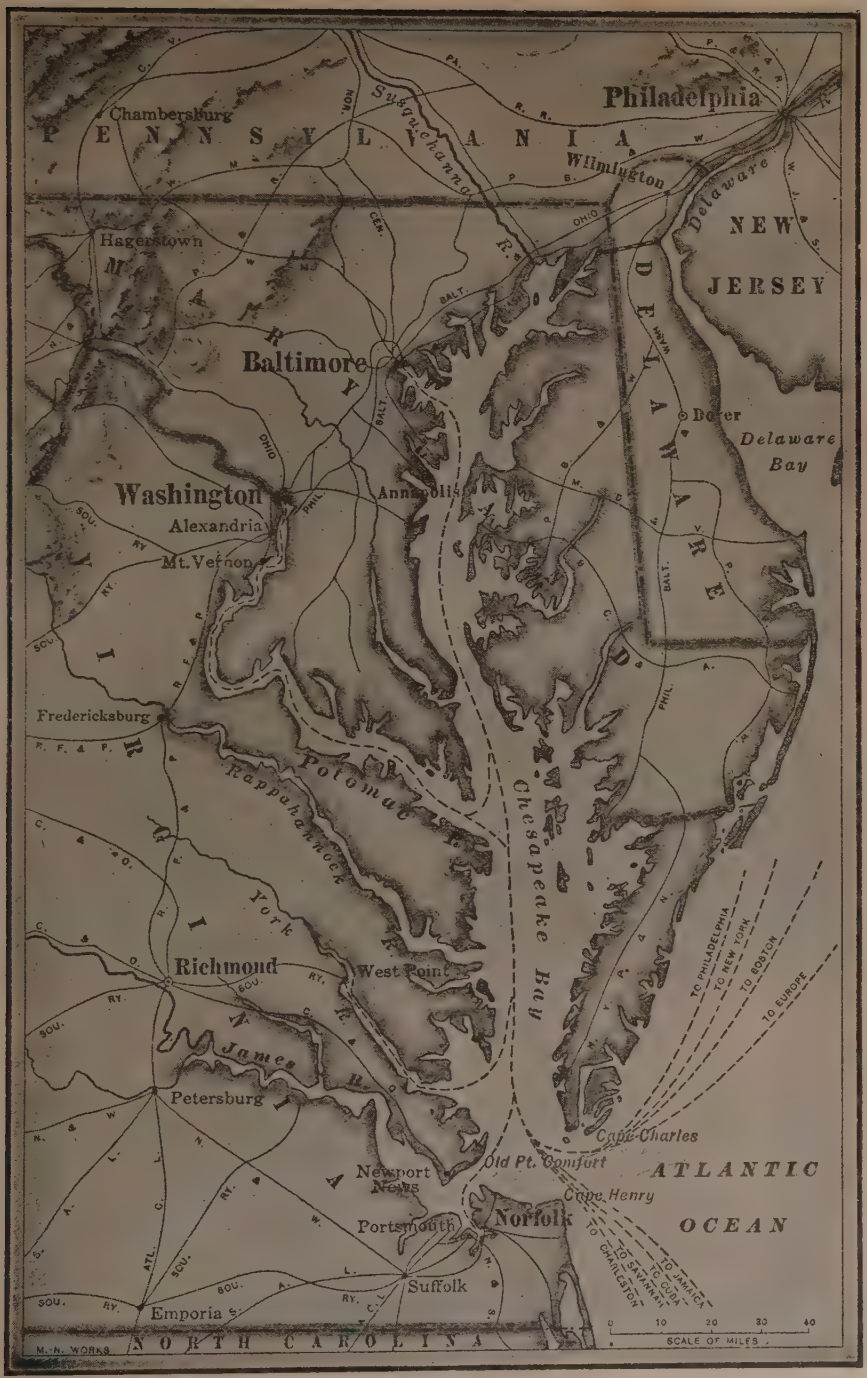


FIG. 82.

Map to show the location of Baltimore and Washington

ment school for the training of army officers is located. Also at POUGHKEEPSIE is Vassar, one of the great colleges for women, like Smith and Wellesley in Massachusetts, and Bryn Mawr near Philadelphia.

Philadelphia and its Chief Shipping Routes. — The leading cities southwest of New York are located along the fall line. Name them as far as Richmond (Fig. 59). The greatest is PHILADELPHIA, which is the third in size in the Union, containing about 1,300,000 inhabitants. As in the case of New York, other important cities are near

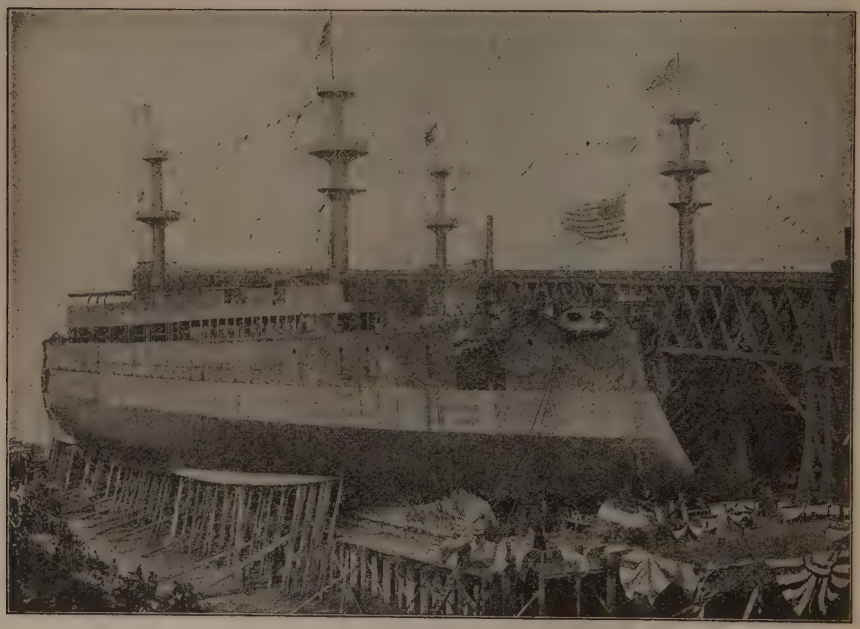


FIG. 83.
One of our great war ships ready to be launched.

by, as TRENTON and CAMDEN, New Jersey, CHESTER and NORRISTOWN, Pennsylvania, and WILMINGTON, Delaware. Water deep enough for ocean vessels extends as far inland as Philadelphia, and its nearness to the coal fields renders it a great shipping point for coal, which is sent to New England and the Southern States.

As in the case of New York, great railway lines enter Philadelphia, connecting it not only with the other cities of Pennsylvania, such as HARRISBURG, the capital, and PITTSBURG, but also with the North, South, and West. Among these lines are the Pennsylvania Railway, and the Baltimore and Ohio, two of the greatest of

the country. There are also many steamship lines from Philadelphia (Fig. 81).

A number of canals has been built in Pennsylvania, as in New York; but owing to the mountainous nature of the country, there is no canal connection between Philadelphia and the Great Lakes. Therefore ERIE, the city in Pennsylvania which would most naturally compare with Buffalo, is much smaller; but being near the coal and iron, it is an important manufacturing city.

Philadelphia and the neighboring city of CAMDEN, being good shipping points, are also great manufacturing centers. The coal and iron near by lead to the manufacture of cars, heavy machinery, and steel ships (Fig. 83) at PHILADELPHIA and WILMINGTON. Great quantities of clothing are also made in Philadelphia, as in Boston and New York; and in carpet manufacture Philadelphia is the most important city in the country.

FIG. 84.

Independence Hall, Philadelphia.

Philadelphia is called the Quaker City, having been founded by William Penn and other Quakers, many of whose descendants still live there. It was the home of Benjamin Franklin, and for a number of years, before Washington was built, it was the capital of the United States. Independence Hall is still preserved, in which the Declaration of Independence was made and the Constitution of the United States was drawn up. The leading educational institution there is the University of Pennsylvania.

Baltimore. — At the head of Chesapeake Bay, in Maryland, is the beautiful city of BALTIMORE, the sixth in size in the United States. Since it has a good harbor, and is connected with the West by railways (Fig. 82), and also has access to the coal fields of Pennsylvania and West Virginia, Baltimore has become a noted manufacturing city and shipping port, like Boston, Philadelphia, and New York. Like them, also, it has a multitude of manufacturing interests.

Baltimore is the seat of Johns Hopkins University; and a few miles

south, at ANNAPOLIS, is the United States Naval Academy, which prepares officers for the navy, as West Point educates men for the army.

District of Columbia. — Southwest of Baltimore, on the Potomac River, in the District of Columbia, is the beautiful city of WASHINGTON, our national capital (Fig. 85). When first set aside, this district was near the center of the settled part of the country.

Washington is unlike other cities in two respects. In the first place, since there was a certainty that it would one day be very large, it was carefully planned, with wide streets and many parks.

FIG. 85.

The National Capitol, at Washington.

In the second place, the inhabitants are not chiefly interested, as in other large cities, in manufacturing and commerce. Here reside the President and his cabinet, members of Congress, foreign ambassadors, and other representatives of the great nations of the world. Besides these there are about twenty thousand men and women engaged in the work of the different departments of the government. The chief buildings, therefore, are not factories and private office buildings, but great government buildings (Fig. 85).

Richmond and Norfolk. — RICHMOND, the largest city of Virginia, is at the head of tide water on the James River. It is, therefore, an important shipping point, as is also Norfolk on the coast. What other cities are in this vicinity? Name the rivers of the state which cut through some of the Appalachian ranges. It was along one of

these routes, through Cumberland Gap, that the early settlers passed to found the states of Kentucky and Tennessee. The water gaps have made it possible for railways to connect the iron and coal mines of Virginia and West Virginia with the coast, so that several of the coast cities are very important shipping points, especially for coal.

More than half of the inhabitants of Virginia are engaged in agriculture, and farm products are, therefore, important articles for transportation. One of the most fertile farming sections in the country is the limestone valley of the Shenandoah, in which the famous Luray Cave and Natural Bridge are situated. Locate these (Fig. 62). Richmond has already been mentioned as a leading market for tobacco; and Norfolk is a great shipping point for cotton.

QUESTIONS AND SUGGESTIONS

Review Questions and Topics. — (1) Describe the physiography of these states: — the Appalachian Mountains; the Piedmont plateau; the coastal plains; the fall line and its importance; the effect of the mountain barrier on westward migration; the effect of the glacier; the coast line. (2) Tell about the climate: — its variations, and their effects on crops and seashore resorts. (3) Tell about the forests: — where they are; what trees they contain; cities; national forests. (4) What fish are found along the coast? (5) Describe the oyster fishing. (6) What cities are noted for their oyster industry? (7) Where is farming carried on? What kinds? (8) Describe dairying. (9) Describe the tobacco industry: — the first use of the weed; where raised; at what cities manufactured; the tobacco plant; uses to which it is put. (10) Tell about fruit raising: — where carried on; kinds; uses to which each is put; cities that are greatly benefited by the industry. (11) State how farming and other industries are dependent on one another. (12) Tell about salt: — how formed; where found; how obtained. (13) State what you can about coal: — tell how coal was formed; how the two kinds differ; why some anthracite is left; to what uses it is put; how it is mined; the cities it has helped to locate; how the miners live. (14) Tell the story of petroleum and natural gas: — where found; how obtained; to what uses put. (15) Do the same for iron ore. (16) Describe the process of obtaining pig iron. (17) In what three forms is iron used? Mention some of the articles made of each. (18) Name the principal cities engaged in the iron manufacture. Find each on the map. (19) In what ways are the farmers and the employees of the factory at Auburn of use to one another? (20) Tell about each of the other kinds of manufacturing mentioned. (21) For what is each of the cities important? Find each on the map. (22) What large cities are near New York? (23) By what water route are New York and Albany connected? (24) New York and Buffalo? (25) Describe the Erie Canal: — its value; how boats pass over it; the cities it has helped to locate. (26) Why has Buffalo grown so large? (27) Jersey City? (28) Describe New York City: — its location; how it is connected with other sections; the industries; its influence upon other cities; how the people live; how they travel about; how their life differs from life in the country. (29) What universities are mentioned? Where is each? (30) Tell about Philadelphia: — why it has be-

come so large; cities near by; other cities; other facts mentioned. (31) For what is Baltimore noted? (32) What cities near by? (33) What city in District of Columbia? What is the principal occupation of the inhabitants?

Review by States: *New York* (*N.Y.*). — (1) Where are the mountains? (2) What are their names? (3) What are the industries there? Why not agriculture among the mountains? (4) What about the relief of the rest of the state? (5) What effect has that upon agriculture? (6) What waters form parts of the boundary of the state? (7) Into what rivers do the lakes empty? (8) What rivers drain New York? (9) State clearly the importance of the Erie Canal. (10) Which cities mentioned in the text are on the canal or on the Hudson? In what industry is each engaged? (11) What other cities of New York are mentioned? For what is each important? (12) Compare New York in size with all of New England. Remember that the scales of the two maps are different. (13) Draw a map of New York like that of Maine (p. 65). When studying each of the other states, do the same for it.

New Jersey (*N.J.*). — (14) Why should peaches grow better in New Jersey than in New England? (15) Name and locate each of the cities mentioned in the text. For what is each important? (16) Make a list of the five largest cities in New Jersey, and compare them with the five largest in New York. (For their populations, see Appendix, pp. iv–vi.) (17) In what ways are some of the largest cities dependent upon the products of Pennsylvania? (18) Add together the populations of all the large cities near New York (see map, Fig. 62) to see how large it would be if it could include those in New Jersey.

Pennsylvania (*Pa.* or *Penn.*). — (19) Where would you look for the best farm land? (20) The principal forests? (21) The leading coal mines? (22) Where are the principal cities? Why located where they are? (23) Make a list of the five largest cities, and compare their size with the five largest in New York and New Jersey. (24) Why are there fewer lakes in Pennsylvania than in New York? (25) Should you expect to find fewer waterfalls also? (See p. 15.) (26) Why, then, is manufacturing so important in this state? (27) What kind of manufacturing is especially important? Why? (28) What advantage do you see in the position of Pittsburg and Allegheny at the junction of two rivers? (29) Through what states would one pass in going by boat from Pittsburg to the gulf? (See map, Fig. 44.) (30) Measure the length and width of Pennsylvania. Also find its area (Appendix, p. iii). Remember that number, for in many of our maps the outline of Pennsylvania is used to show the comparative size of other sections. (31) Is Pennsylvania larger or smaller than New York? Virginia? New England? (32) Is it larger or smaller than the state you live in? How much?

Delaware (*Del.*). — (33) Which is the principal city in this state? (34) For what is it noted? (35) Why is it especially well situated for that industry? (36) Compare its size with New York, Buffalo, Pittsburg, and Albany. (37) The principal industries of the state are fruit raising and farming. What two reasons can you give why it is well fitted for these? (38) Have you ever eaten any Delaware fruit?

Maryland (*Md.*). — (39) In which section is farming most important? Why? (40) Of what importance are the mountains? (41) Notice how branching Chesapeake Bay is. Why is it so irregular? (42) What influence should you think this would have upon the number of oysters found there? (43) Why is Baltimore favorably situated for receiving coal and iron from Pennsylvania? (44) For canning fruit, vegetables, and oysters? (45) What would be the effect upon the growth of Baltimore if the land should rise again so that Chesapeake Bay disap-

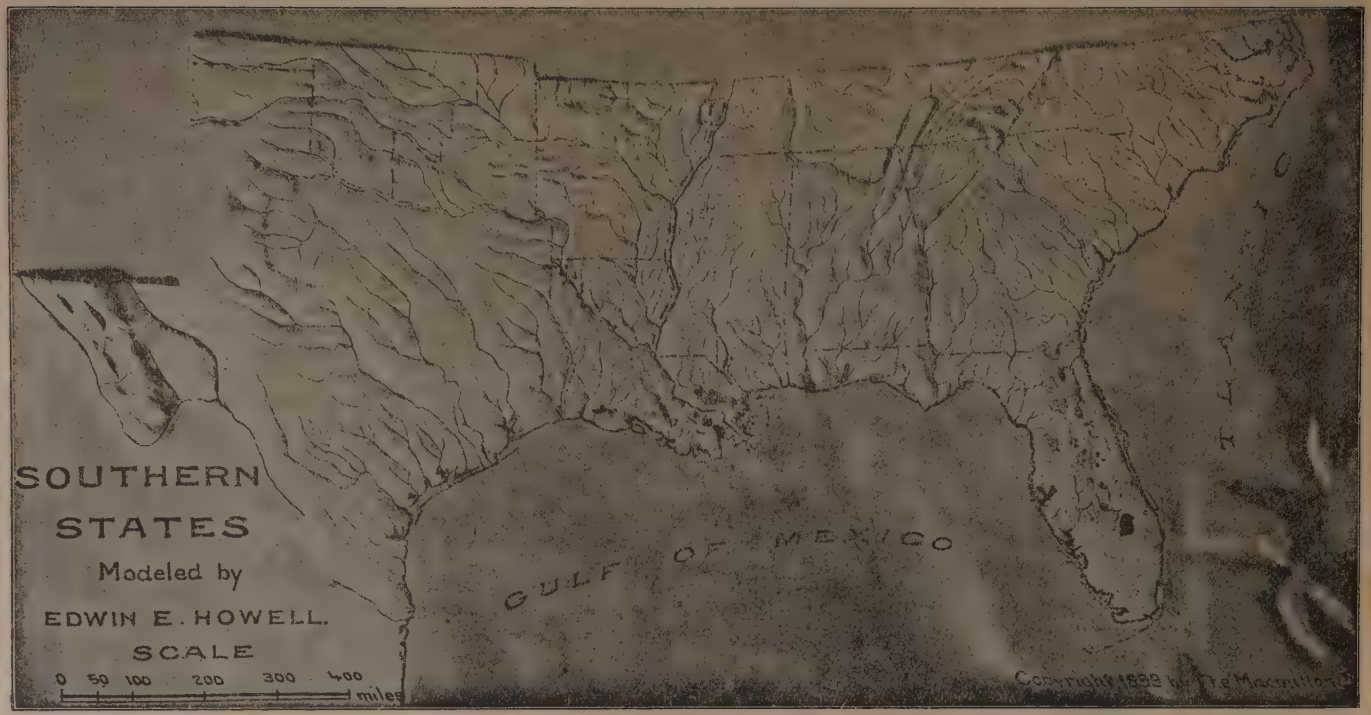
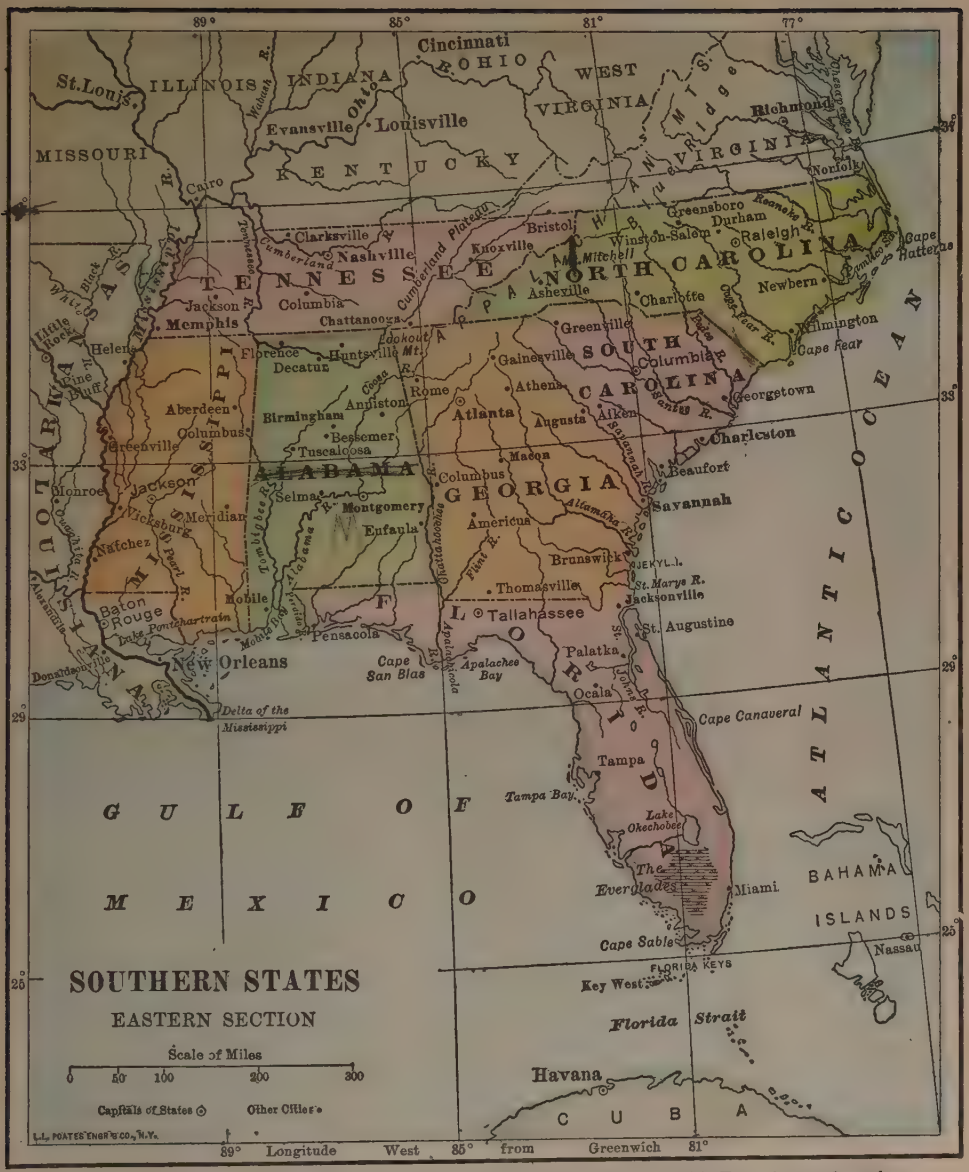


FIG. 86.

Relief map of the Southern States.

FIG. 87.

MAP QUESTIONS. — (1) In what three parts of this section are mountains found? (2) What are the names of the mountains? (3) Which states have no mountains? (4) What are the principal tributaries to the largest river of the section? (5) Through what states would you pass in going by water from New Orleans to Chattanooga? (6) Find some natural boundaries in this section. (7) Compare the coast with that of New



England. Why the difference? (8) Why are there so few lakes? (9) The rivers that rise in western Texas — as the Colorado — are often perfectly dry in the western third of their course. Why? (10) Name the states in this group. (11) Find the capital of each. (12) Which of the states have a seacoast? (13) Which have none? (14) Which border the Mississippi? (15) Which drain into that river? (16) Can you give reasons why the largest city is near the mouth of the Mississippi?

FIG. 88.

Map to show the location of New Orleans, Memphis, Birmingham, and Atlanta.

peared and the Susquehanna flowed through it? (46) Compare the size of Baltimore with Philadelphia, New York, and Boston.

Virginia (*Va.*). — In what other state is the capital the most important city? (47) Describe the tobacco industry. (48) Which cities are engaged in its manufacture? (49) What river separates Virginia from Maryland? (50) What river crosses the middle of Virginia? (51) Compare Richmond in size with Albany. (52) How does Virginia rank in iron production (Fig. 222)?

West Virginia (*W. Va.*). — (53) What disadvantage is it to this state that it has no seacoast? (54) How would we reach the ocean by water from West Virginia? (55) Where is the largest city? Why there? (56) How does it compare in size with Pittsburg? (57) Should you expect to find much forest in this state? (58) Much farming? (59) Coal, iron, petroleum, and natural gas are found there. Of what value are these? (60) What mountain range in the east?

General. — (61) Describe the surface features of this group of states from the relief map (Fig. 63). (62) Describe the differences in climate in the different parts. (63) State the principal industries of the Middle Atlantic States. (64) Make a list of the ten largest cities. Add their populations together, and compare the result with the ten largest in New England. (See Appendix, pp. iv–vi.)

Suggestions. — (1) Collect pictures of Niagara Falls. Learn something about the use of Niagara power. (2) Examine a live oyster or clam, to see what holds the shells together. What do you suppose is the object of the shell? (3) The duty paid to the United States government on a pound of smoking tobacco is 12 cents. How much is that per ounce? (4) Find where the canned fruits and vegetables in your neighboring grocery store have come from. (5) Make a collection of the kinds of coal. Of coke and iron ore. (6) In small bottles collect the products made from petroleum. (7) Collect samples of cast iron, wrought iron, and steel. (8) Estimate on the map (Fig. 44) the distance by water from New York City to Duluth. (9) Find the population in the ten largest cities along the Great Lakes by adding the numbers given in the Appendix. (10) Are there any canals in California? (11) Why are locks in canals necessary? (12) Give reasons why freight rates on canals are cheaper than those on railways. (13) Write a composition, giving the reasons why one might prefer to live in a large city; why one might prefer to live in the country. (14) Collect pictures of scenes in a large city; in the country. (15) Can you give a reason why the Erie Canal should have reached to Lake Erie instead of to Ontario? (16) Make a drawing of these states, including the principal rivers and cities. Locate the capitals.

For References, see *Teacher's Book.*

VII. SOUTHERN STATES

Physiography. — Almost the entire area included in this group of states is made up of plains. The most level portions are the delta and flood plain of the Mississippi, and the coastal plains, which skirt the entire Gulf and Atlantic coast of the Southern States (Fig. 43). The coastal plains are very level; and, since the rainfall is heavy, they are often swampy, especially near the rivers. Their higher portions are more irregular and better drained; but, since the soil is sandy, there are large areas which are too barren for agriculture and are therefore still covered by an open pine forest.

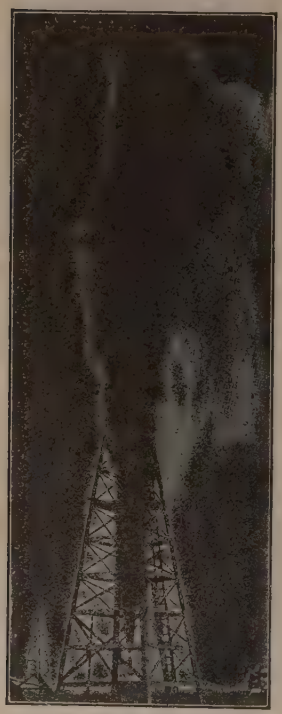


FIG. 89.

An oil "gusher," Spindle Top oil field, Beaumont, Texas.

West of the coastal plains that border the Atlantic, and separated from them by the fall line (Fig. 59), is the still higher Piedmont plateau, which extends to the base of the Appalachians. The Piedmont section has a good drainage and excellent soil, so that it is the seat of extensive agriculture, especially cotton and tobacco raising. This plateau slopes gradually from the base of the Appalachians, where its elevation is about 1000 feet above sea level, to the fall line, where the elevation of the plain is from 100 to 500 feet above the sea. It is really a region of old mountains worn down to a rolling and, in places, slightly hilly plain.

On Figure 88 it will be seen that the Appalachian Mountains, with their rich coal beds, continue southwestward from Virginia into Alabama. In the Southern States these mountains are generally low, as they are in the Middle Atlantic States; but in western North Carolina and eastern Tennessee the mountains are much higher.

As in Pennsylvania and West Virginia, there is a rough plateau west of the Appalachians. This plateau is deeply cut by river valleys, and is so rugged that it is still covered by extensive forests and has few inhabitants. Still farther west are the broad and fertile plains of the Mississippi Valley and of Texas. These are interrupted by some low mountains in Oklahoma, Arkansas, and Texas.

In western Texas the plains rise until they become high plateaus, reaching an elevation of 4000 to 5000 feet near the base of the spurs of the Rocky Mountains, which extend into Texas.

The coast line is much more regular than that of New England. As has been stated (p. 17), this part of the continent has been raised instead of lowered. However, after the continental shelf was lifted enough to form the coastal plains, there came a slight sinking, though much less than in New England. This sinking has admitted the ocean waters into the valleys, forming shallow bays and poor harbors. Sand bars, built by waves and tides, have made these harbors even poorer; and each year large sums of money are spent by the government in dredging the sand away from the harbor entrances.

Bars are built, not only opposite the bays, but also where the storm waves break in the shallow water off shore. It is in this way that Capes Hatteras and Fear have been built, as well as the long chain of bars along the low southern coast. The waves throw the sand up in banks, and the winds pile it still higher, forming sand dunes. These facts partly explain the reason why there are not so many large coast cities in the South as there are along the irregular northern coast.

Still another kind of coast is found in southern Florida, where countless millions of coral polyps live in the warm waters of the Gulf Stream. These have built the limestone rock which forms the southern part of the Florida peninsula and also the many reefs and small islands, or *keys*, which lie just south of Florida.

Climate. — The low plains of the Southern States lie so far south that the climate is everywhere warm; and the damp winds from the Gulf bring an abundant rainfall to them. These conditions make it possible to raise cotton, sugar cane, and rice, which cannot be grown in the colder Northern States. In southern Florida, semi-tropical and even tropical fruits are easily raised. Among the Florida fruits are oranges, lemons, pineapples (Fig. 90), cocoanuts, and bananas. What is the latitude of southern Florida?

During the cold and disagreeable Northern winter, the Southern weather is mild, like spring and autumn in the North. Flowers are in blossom and birds are singing, many of them having migrated there for the winter. Large numbers of Northern people also go South to spend the winter at

such resorts as JACKSONVILLE and ST. AUGUSTINE. The latter, founded in 1565, is one of the early Spanish settlements. One of the important winter industries of the inhabitants is the entertainment of winter visitors.

FIG. 90.
The pineapple growing in Florida.

While Northern people travel South in winter to escape the cold, many Southerners go North in summer to escape the heat. Others summer among the high mountains, where the climate is cool even in midsummer. The best-known mountain resort is ASHEVILLE in North Carolina. In some places, as HOT SPRINGS, Arkansas, there are mineral springs, to which people resort to be cured of certain diseases.

Western Texas has a different climate from the other parts of the South. Being too far from the sea to be reached by damp winds, it receives little rain. The occupations are influenced accordingly. As one travels westward from the Gulf, he passes from the warm, damp, coastal plains to a semi-arid country. At first there are dense forests; then come plains with scattered trees, especially the live oak (Fig. 91); beyond these are broad prairies without trees, but with extensive cotton fields. Next a section is reached which is too dry for cotton, and this country, fitted only for ranching, stretches westward for several hundred miles.

FIG. 91.
A live-oak grove with the Southern moss hanging from the limbs.

Forests.—Extensive areas in the Southern States are timber-covered, and among the forests are found many trees unknown in the North, some of them, such as the magnolias, bearing large, sweet-scented flowers. There are forests not merely

among the mountains, but also on the coastal plains, especially where the soil is sandy (Fig. 92). The method of lumbering is somewhat different from that in New England (p. 51). Instead of floating the logs down to tide water by means of the spring freshets, sawmills are located in the midst of the forests, if possible on the river banks. To them the logs are brought, either by water, by wagon, or by train, and are sawed into lumber.

The long-leaved or hard pine, often called the *Georgia pine*, which grows on the sandy coastal plains, is much used for flooring in the North. It is shipped North from the coastal cities of CHARLESTON, South Carolina, SAVANNAH and BRUNSWICK, Georgia, JACKSONVILLE and PENSACOLA, Florida, and MOBILE, Alabama.

While the pine thrives on the low, sandy plains, the hardy oak and other trees are found upon the plateaus and among the mountains. Quantities of hardwood are shipped from MEMPHIS, Tennessee; but although much of the pine, oak, and other lumber is sent North, a great deal of it is manufactured into doors, blinds, furniture, etc., in the South, as at HIGH POINT, North Carolina, MACON and MONTGOMERY on the fall line, and at ATLANTA. There is also lumber manufacturing at the coast cities already mentioned, as well as in many other Southern cities.

FIG. 92.
A scene in the pine forest of the Southern coastal plains.

These forests are of value in two other ways. From them are obtained *turpentine* and *tannic acid*, the liquid in which hides are soaked to make leather (p. 61). In the Northern States hemlock bark furnishes a tannic acid which gives the leather a red color, so that shoes made from it need to be blackened; but tannic acid from the chestnut oak of the South gives a lighter or tan color, and it is from such leather that tan shoes are made.

AGRICULTURE

Although farming is carried on in all the states we have thus far studied, other occupations are followed by great numbers of people.

Give examples. In the South, however, with its excellent soil and warm climate, agriculture is the principal industry. Indeed, until recently, there was almost no other industry except commerce.

While the climate makes it possible to raise crops which cannot be grown in the cooler Northern States, some products are the same as those of the North. For instance, tobacco raising, already described as an industry of great importance in Virginia, is also extensively carried on in Tennessee and North Carolina. CLARKSVILLE, Tennessee, and DURHAM, North Carolina, are centers for this industry. Name some Virginia cities likewise engaged in it.

Cotton. — The crop in the South that surpasses every other in value is cotton. The early colonists soon discovered that cotton

FIG. 93.

Rural scene in the cotton belt.

could easily be raised, and that a ready market awaited the crop abroad. Their fields were far too large to be cultivated without many laborers, and negro slaves, offered for sale at that time in many parts of the world, were found especially suited to work in the cotton fields. In this way it came about that cotton had much to do with the spread of slavery in the Southern States.

It is owing to the system of slavery that there are now eight million negroes in this country. Among the mountains of North Carolina and other states, where cotton, rice, and sugar cane cannot thrive, and where the farms must be small, there are whole counties where there are almost no negroes ; but in portions of some of the Southern States they far outnumber the whites. Most of the negroes still make their living by working in the cotton fields, for cotton is the principal crop all the way from North Carolina to Texas.

In 1907 the Southern States produced about 13,560,000 bales of cotton, each weighing nearly 500 pounds. Of this, about 9,000,000 bales were shipped abroad, especially to England. The remainder was manufactured at home, particularly in New England and the South. In the same year the entire world produced a little over 19,000,000 bales, which makes it clear that the United States furnishes much more than half of all the cotton grown. When we remember that much of our clothing is made of cotton, it is evident that the Southern States make it their chief work to help clothe the various peoples of the world.

Cotton requires rather fertile soil and a long, warm summer with an abundance of rain. These conditions exist throughout the regions marked as the cotton belt in Figure 213; but, on account of the short summer season, they are wanting in the North.

Cotton seeds are planted in the spring, in rows about three feet apart, and the weeds are kept out until the plants are nearly grown. They reach a height of about three feet, and develop large blossoms that pro-

FIG. 94.

Picking cotton.

duce a pod, in which the cotton and cotton seed are contained. On maturing, the pod bursts open, revealing a white woolly ball, known as *cotton*, which in appearance resembles the downy substance in the thistle and in the pod of the milkweed.

When a great number of these pods have split open, a cotton plantation of five or six hundred acres presents a beautiful sight, — much like a field flecked with snow (Fig. 94). Then the busy season for the pickers begins. As many as two or three hundred men, women, and children

may assemble in one field, carrying bags and picking cotton, singing and chattering the livelong day.

When plucked from the pods, the cotton is attached to seeds, and these must be removed before the cotton can be of use. The seedless cotton is

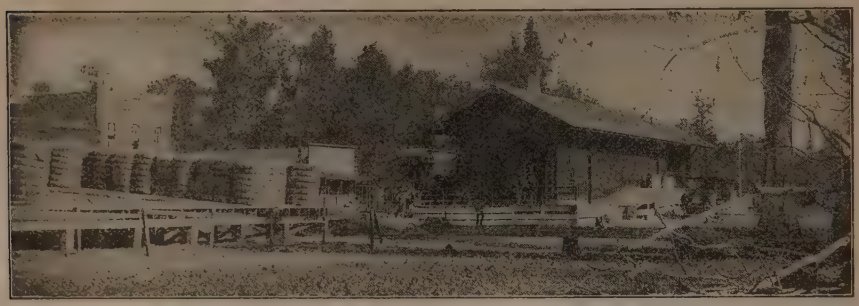


FIG. 95.

Bales of cotton at a railway station in the South.

tightly pressed into bales of about five hundred pounds, which are then covered with coarse jute bagging, bound with iron bands, and shipped away to the warehouses, to be sold.

Rice. — This is one of the most valuable food products of the world, being the main support of millions of people, as the Chinese, for example. Although it is not a staple food in the United States, we do not raise even enough for our own use. Rice requires a warm climate and a damp soil, such as prevail on the low coastal and flood plains from the Carolinas to Texas. Although raised throughout that section, the largest quantity comes from Louisiana.

In the cultivation of rice, after preparing the ground, as for other grains, and planting the seeds, it is usually necessary to flood the fields from ditches. As the plant grows, it forms a slender stalk, upon the top of which appears a head of seed somewhat resembling a head of oats, the whole reaching a height of from three and a half to six feet. Just before the harvest season the water is drawn off, so that horses may enter the field, and the grain is then cut and the kernels threshed out, as in the case of wheat. After the hull is removed, the grains are polished at such cities as NEW ORLEANS, SAVANNAH, and CHARLESTON, and are then ready for market.

Sugar Cane and Sugar. — There is a number of plants from whose sap sugar is made. One of these, the sugar maple, has already been mentioned (p. 53) ; another is the sugar beet, raised in great quantities in some of the European countries, and also, of late, in

many parts of the United States. This beet is a very important source of sugar, because it can be raised in the cool, temperate climate. For a long time, however, the principal source of sugar has been the sugar cane, a plant that looks somewhat like corn.

This plant requires a fertile soil and grows only in warm regions, where there is practically no frost even in winter. For this reason the most cane sugar comes from tropical lands, such as the Hawaiian Islands, the Philippines, Porto Rico, and Cuba (Figs. 215 and 507). In our own country the most noted sugar district is the delta of the Mississippi in Louisiana.

In that section there are large sugar plantations, some of them having several thousand acres planted to sugar cane. The cane is planted in rows about six feet apart, and grows to be two or more inches in diameter and from four to ten feet in height (Fig. 97). A crop is raised every twelve months, being cut in the fall and taken to the sugar house, where the cane is ground between rollers to squeeze out the juice.

The juice, or sap, after being treated with lime, is placed in large vats and heated to evaporate the water. As a result, two products are formed, — a thick black molasses and brown sugar.

The crude sugar is sent to the refinery, either in NEW ORLEANS (Fig. 100) or in the North, where it is changed to white sugar by

FIG. 96.

Partial view of grounds and buildings of Tuskegee Normal and Industrial Institute, Tuskegee, Alabama.

a complicated process, as a result of which the various grades of granulated, powdered, and lump sugar are produced. In changing the brown to the white sugar, burned bones, called boneblack, are made use of to filter out the impurities. The bones are obtained

Fig. 97.

Cutting the sugar cane in Louisiana.

from Chicago and elsewhere, where large numbers of animals are killed for meat.

The molasses is used for various purposes, some of it, especially in the West Indies, being consumed in the manufacture of rum. Molasses is a by-product, like sawdust in a lumber mill, and is not considered of much value by the sugar raiser.

Fruits. — Fruits, such as watermelons, apples, peaches, pears, and grapes, flourish in the warm climate of the Southern States. Florida, however, is so far south that it has fruits of an entirely different kind. There are orange and lemon groves in many parts of the state; but in the northern part the trees have been greatly injured by frosts. During cold waves (p. 12), cool air from the North sweeps over the Southern States even as far as Florida, sometimes causing great destruction. Farther south, where frosts never appear, are found the more tender tropical plants, such as cocoanuts and pineapples (Fig. 90). The latter grow especially well on the low coral keys, the plant resembling an arid-land plant, with the pineapple nestled in the midst of sharp-pointed leaves.

Florida and other Southern fruits are sent in great quantities to the Northern States, where they appear in the markets early in the spring. Thousands of bushels at a time are shipped by fast train

and steamer. They are sent together with early vegetables, and are intended for hundreds of cities and towns in the North.

Other Crops. — Many other crops besides those thus far named are raised in the South, corn and wheat being among the most important. An immense quantity of corn is produced, and over almost as wide an area as cotton itself; but since corn and wheat are raised so much more extensively in states farther north, they are treated later (pp. 124 to 126).

Peanuts and sweet potatoes are two important products of these states, particularly of North Carolina. Stock of various kinds, as horses, cattle, sheep, and hogs, is also raised, each plantation usually having some of these animals. In the open pine forests of the Florida and Georgia coastal plains, large numbers of cattle are raised.

An important animal in the South, and one which makes a strong draught animal well suited to a warm climate, is the mule. On the fertile plains, especially in Tennessee and Kentucky, much attention is paid to raising mules and fine breeds of horses.

Grazing. — In western Texas, where the rainfall is insufficient for agriculture, grazing is the chief industry. The climate is so dry that the grass cures and becomes hay while still upon the ground,

FIG. 98.

Cattle on the Great Plains of Texas.

thus offering such excellent food for cattle and sheep that ranching is a thriving business. One may travel for two or three hundred miles westward over the plains, seeing little else than a ranch house here and there, with an occasional herd of cattle or sheep.

While there is no reason for large cities in this section, and the life of the cowboys and sheep herders is a lonely one, it is their work that helps to supply our tables with meat, and provides us with woolen clothing and with shoes.

Mineral Products

Coal and Iron. — Coal and iron ore constitute the principal mineral wealth of the South. These two minerals occur among the mountain ranges all the way from Pennsylvania to the Southern States. They are mined in several places, as near Chattanooga in eastern Tennessee; but the most noted of all is a district at the extreme end of the Appalachian system around Birmingham, Alabama. This region is so rich in these products that it now ranks as the second iron-producing section of the continent.

We learned that Pennsylvania enjoyed a great advantage in having iron ore and coal near together; but in Birmingham even more favorable conditions are found. That city has grown up in the midst of a valley, around the margin of which are found iron ore, coal, and limestone, the three materials necessary for the production of iron and steel. In consequence, this section has become a great manufacturing center.

Stone. — A large amount of building stone, especially granite and marble, is found in northern Georgia; and near Knoxville, in eastern Tennessee, much marble of different colors is quarried. What city in Vermont is likewise noted for marble? (p. 54.)

Gold and Precious Stones. — In the mountainous portion of western Georgia and North Carolina there is a gold-producing belt which formerly yielded much gold, and from which some is still obtained. Occasionally, too, precious stones, as sapphires and diamonds, are found.

Phosphates. — The soil of farms often becomes worn out and needs a fertilizer. There are various kinds of fertilizers, as manure and bone dust, which furnish the plant food needed by crops; but one of the most important fertilizers is mineral phosphate. This is found in great quantities in Florida, Tennessee, and South Carolina. It is a deposit in which are found fossil remains of many animals, such as the teeth of sharks, and the bones and teeth of many large land animals. Among the latter is the huge mastodon, which lived in this country long before white men came. This fertilizer is so valuable that it is shipped to the Northern States from Charleston, Jacksonville, and Tampa, to be used on the farms in that section of the country.

Salt and Oil. — *Salt* is obtained in Louisiana and in Texas; and recent discoveries of vast quantities of *oil* in Texas (Fig. 89) have made that state one of the most noted oil-producing regions in the world.

Manufacturing

Birmingham, the leading iron manufacturing center of the South, is located on an old cotton plantation. In 1880 it had a population of 3086; but now it contains about forty-five thousand per-

sons. What special advantage has it? In this city, as in Pittsburg and Allegheny, the iron ore is reduced to iron in blast furnaces (p. 81), and then changed to steel and various other useful articles. Several other cities near the mountains are also noted for their iron manufacturing, as ROME and ATLANTA, Georgia, and KNOXVILLE and CHATTANOOGA, Tennessee.

Before the war there was very little manufacturing in the South. The negroes, who did most of the manual labor there, lacked the training necessary to handle machinery. At that time nearly all of the slaves were unable to read or write; but now only about half of the colored people are illiterate. The raw materials were shipped away, and manufactured articles brought back. Thus the cotton went to England, New England, and elsewhere, some of it to be returned in the form of clothes; and the lumber was shipped to various Northern cities, to be sent back in the form of furniture. The iron ore was little mined.

This situation is now fast changing. Since the Civil War the Southerners have become actively engaged in manufacturing, and many Northerners, recognizing the superior natural advantages, have moved into the South. The South has awakened to its great opportunities, and the hum of factories is now heard in many places. The iron industry is already well developed, and each year new cotton mills are being erected.

Some idea of what one of these cotton mills means may be gained from a certain one in Alabama. It employs 600 hands, including men, women, boys, and girls, and pays them about $2000 per week in wages. Each day this mill consumes 15 bales of cotton, averaging about 500 pounds; and since the average yield per acre of land is about 250 pounds, you can easily estimate about how many acres of cotton are called for in one year by this one mill. White people are employed, and as a rule they live in villages that have sprung up in the immediate neighborhood of the mills. Some are so large that they have their own schoolhouses and churches.

FIG. 99.

A cotton factory at Huntsville, Alabama.

Texas raises more cotton than any other state, but most of it is still shipped away. In that state, in 1897, there were only four

cotton mills, while North Carolina had about 200. Nor is there much cotton manufacturing in Arkansas, Mississippi, and Louisiana.

Formerly the cotton seeds were slowly picked out of the cotton by hand, and then thrown away. Whitney's invention of the Cotton Gin,[1] in 1793, enabled one laborer to separate from the seed as much as 1000 pounds in the time that was formerly required to clean five or six by hand. That, of course, made cotton raising far more profitable, and had an immense influence upon the amount produced, as well as upon the number of slaves needed.

Instead of being thrown away, the cotton seeds are now saved. There are two or three pounds of seeds to one pound of fiber; and since, on the average, one acre produces about 250 pounds of seedless cotton, the quantity of seed from a 600-acre plantation is very large. It was an immense loss when the seeds were thrown away; but now a kind of oil, called *cotton-seed oil*, is extracted from them, and is used in making soap, imitation butter, and a substitute for olive oil. Further than that, the part of the seed that is left after the oil is pressed out has been found to be an excellent food for cattle and a good fertilizer.

While hundreds of Southern cities and towns now manufacture cotton cloth and cotton-seed oil, the most noted are COLUMBIA and GREENVILLE, South Carolina, CHARLOTTE, North Carolina, and AUGUSTA, COLUMBUS, and ATLANTA, Georgia. What cities in New England are likewise noted for cotton manufacture? How do they compare in size with these? (See tables in Appendix, pp. iv-vi.)

Some of the other articles manufactured in the South have already been mentioned, as furniture and other objects from wood (p. 101), tobacco (p. 102), and sugar (p. 104). In each case this work in confined mainly to the section in which the raw material is raised. For example: NEW ORLEANS, in the midst of sugar plantations, has large sugar refineries; MACON, MONTGOMERY, MOBILE, CHATTANOOGA, MEMPHIS, and LITTLE ROCK, all in the neighborhood of forests, produce lumber and furniture; and RALEIGH, DURHAM, WINSTON, and other cities in northern North Carolina manufacture tobacco. Which of the manufacturing cities mentioned are on the fall line? (Fig. 59.)

KEY WEST, on a small coral key south of the Florida peninsula, is also noted for its tobacco factories. It is so near Cuba that the Havana tobacco, so much prized by cigar smokers, is easily obtained. There is also cigar manufacturing at TAMPA. Why there?

[1] Gin is merely an abbreviation for engine.

Leading Cities and Shipping Routes

The *largest* cities so far studied have been located at points on the water where the shipping advantages are superior, and where numerous factories have consequently been located. Give examples. For reasons already mentioned, the Southern States have not so many fine harbors as the Northern States (p. 17). Besides that, although many factories have recently been built, the people are still mainly engaged in farming. On these accounts we cannot expect to find so many or so large cities as in the North; and most of those that do exist may be looked for either on the Mississippi River or on the coast.

New Orleans — The greatest of all Southern cities is New Orleans, the largest city in eastern United States south of St. Louis. It has a population of nearly 300,000, or more than half

Fig. 100.

Loading a river steamer at the levee in New Orleans. A large sugar refinery is seen in the distance, on the left.

as many as Boston, and is the twelfth in size in the United States. When we recall the advantages of New York's water connection with the West, we can readily explain the growth of New Orleans. Pittsburg on the Ohio, St. Paul on the Mississippi, and Kansas City on the Missouri, may all be reached from New Orleans by boat (Fig. 44). How do these distances compare with those from New York to Chicago and to Duluth? Also how far apart are Pittsburg and Kansas City?

New Orleans is situated at the gateway to the most productive valley in North America. The city is located about one hundred miles from the mouth of the Mississippi, at a point to which ocean vessels can ascend, although they dare not venture much beyond it. On the map (Fig. 87) you will see that an arm of the sea, called Lake Pontchartrain, reaches up to the city, and that New Orleans is located at the place where the river and lake are nearest together. The stream there makes a bend in the form of a half circle, which explains the reason for the name of CRESCENT CITY, commonly applied to New Orleans.

Much of the land on which New Orleans rests is frequently below the level of the river. In fact, from Memphis southward, a large part of the land on either side of the river is a low flood plain, spreading out for

FIG. 101.

Shearing sheep. Tell what you see in the picture.

many miles, and often threatened with floods. The mighty river, receiving tributaries from regions thousands of miles apart, is charged with yellow mud, which gradually sinks to the bottom as the current becomes slower toward the mouth. This has built up the bed of the river, so that at high water the floods would spread over the broad flood plains if these were not protected by strong walls of earth, called *levees*. In spite of their strength, these embankments occasionally give way, especially in the springtime, when the snows are melting in the North; then the destruction to life and property is appalling. At such times hundreds of men patrol the levees night and day to check the slightest leak. Even a hole made by a crawfish may be the beginning of an awful inundation. Why?

Some peculiar consequences result from this condition. The soil on which New Orleans stands is naturally very wet. Indeed, in digging foundations for buildings, water is reached a short distance below the surface. On that account there can be no cellars under the houses, and it is difficult to provide proper drainage.

Since the city once belonged to France (p. 33), French is still a common language there, one person in six being of French stock. About one person in four is colored.

Frost seldom reaches this city, and the midwinter weather is rarely colder than the occasional frosty early autumn evenings of the North. What must be the effect of this climate upon the style of houses? Also upon the presence of birds, flowers, and fruits in winter?

Knowing the farm products in this region, we have a key to the exports from this point. New Orleans is an important cotton market and a center for sugar, molasses, and rice, besides being a shipping point for products from farther up the Mississippi Valley.

Like New York, this city is now connected with the distant interior by rail as well as by water. The Illinois Central Railway extends all the way to Chicago, running parallel to the river for much of the distance; the Louisville and Nashville reaches Louisville and St. Louis; and the Southern Railway runs most of the distance from New Orleans to Washington, connecting with the Southern Pacific, which extends westward, across Texas, to California.

Memphis and Atlanta. — The cities next in size are MEMPHIS and ATLANTA (Fig. 87), each having more than one hundred thousand inhabitants. The former is situated in Tennessee, on a bluff where the Mississippi River swings out upon its broad flood plain. Why is that a favorable location? Memphis is one of the great cotton centers and lumber markets of the South.

Atlanta, the "Gate City," is one of the few large cities not located upon a water route. Northeast of it, for over 350 miles, there is no easy pass across the mountains; and until 1880 no railway crossed the mountain ranges in all that distance. Near where Atlanta stands, however, there is a good route; and railways reaching westward from the Carolinas or northern Georgia come together there, making Atlanta a great railway center. Owing to its advantageous situation, Atlanta is the leading interior wholesale market of the South, and surpasses all Southern cities in the number and variety of its manufactures.

NASHVILLE, the capital of Tennessee, has sawmills, furniture factories, and flour mills. Being in the midst of a splendid farming

country, it is a distributing point for supplies to the neighboring towns and farms. It is also one of the educational centers of the South, having Vanderbilt University and other important schools. There are several other educational institutions in the South, among which is the TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE of Tuskegee, Alabama (Fig. 96), a school for the training of the negro. The object of the school is to furnish its students with an education, fitting them to become proper leaders of the people of their own race, and thus to bring about better moral and material conditions.

Instruction and practical work are given in all the trades, such as carpentry, blacksmithing, sewing, domestic service, nursing, etc. The Institute owns 2600 acres of land, has 145 instructors, and over 1500 students enrolled. This school is doing wonders for the negro people of the South. It has attained a remarkable degree of success under the able direction of the noted negro educator, Booker T. Washington, its principal.

Texas Cities. — Texas is the largest state in the Union. Find how it compares with New England in size (Fig. 44). The western third of the state, as was stated on page 100, is fitted mainly for grazing although there is some mining in the mountains. Throughout that entire section there are no cities and almost no large towns, except in the extreme western corner, where EL PASO is situated. The word El Paso means "the pass" in Spanish, for this city is situated at a pass in the Rocky Mountains, through which the Southern Pacific Railway passes westward, while an important line extends southward into Mexico.

East of the arid and semi-arid plateau is the fertile cotton belt. In this there are many cities, such as DALLAS and FORT WORTH — both shipping points, not only for cotton but also for cattle from the Western plains. Dallas is also a busy manufacturing city. AUSTIN, the capital, is a beautiful city on the Colorado River, and SAN ANTONIO is a quaint Mexican town; for Texas once belonged to the Mexicans, but declared its independence in 1836, after which (1845) it was taken into the Union.

Two of the largest cities of Texas are HOUSTON, near the coast, and GALVESTON, the principal seaport west of New Orleans. Immense quantities of cotton and other products are shipped from Galveston. It is also a port of outlet for goods from the Far West.

Oklahoma. — Many Indian tribes have been given land in what

was formerly called the Indian Territory; but, owing to the fact that the Indians owned the land, little could be done to develop it until it was opened up to white settlement in part, as a territory at first, and afterward as the state of Oklahoma.

Oklahoma, like Texas, is mainly a great plain, arid in the western part, but in the eastern part a fertile agricultural district. The

FIG. 102.

Scene on an Indian reservation.

principal products are corn in the north and cotton in the south. The western part was opened to settlers in 1890. Since then its growth has been so marvelous that almost all the farm land is now occupied and tilled. There are two flourishing cities, — OKLAHOMA and GUTHRIE.

QUESTIONS AND SUGGESTIONS

REVIEW QUESTIONS AND TOPICS. — (1) Describe the physiography of these states: — the plains and their products; the mountains; the Texas plains; the coast — its bars, harbors, and coral keys. (2) Tell about the climate: — how it differs from the North; the climate of the mountains; the crops; the winter resorts; the summer resorts; the arid section. (3) How do the forests and methods of lumbering differ from those of Maine? (4) Which cities have important lumber industries? (5) What besides lumber is obtained in the forests? (6) What about tobacco raising in the South? (7) Tell about cotton: — the effect in encouraging slavery; amount produced; where grown; method of planting and picking. (8) Do the same for rice; and tell, also, what it is used for. (9) Describe the sugar industry: — source of sugar; where the sugar cane grows, and why; method of planting and harvesting; change to sugar, — where done, methods employed, and products obtained. (10) What fruits are raised in the South? Why there? (11) What other crops are important? (12) Where is grazing carried on?

Why there? How are we dependent upon these ranchmen? (13) Where are coal and iron found? (14) What great natural advantages has Birmingham? (15) What other mineral products are obtained? (16) Tell about the phosphate. (17) Where is iron manufacturing carried on? (18) Tell about manufacturing in the South: — former condition; present change; importance of a single cotton factory; the cotton gin; uses of cotton seed; cities engaged in cotton manufacturing; cities engaged in other manufacturing. (19) Why are there not so many large cities in the South as in the North? (20) Tell about New Orleans: — the reason for its importance; why located just where it is; the need of levees; the inhabitants; the climate; the industries. (21) For what are Memphis and Atlanta important? (22) Chattanooga and Nashville? (23) What about the river ports? (24) The seaports? (25) Name the principal cities of Texas and tell for what each is noted. (26) Tell something of the life of Booker T. Washington.

Review by States: *North Carolina* (*N.C.*). — (1) Which part is mountainous? Name and locate the highest peak in the East. (2) What two plains in this state? (3) Which cities are mentioned in the text? Where is each? For what important? (4) What capes on the coast? (5) What are the industries? (See Figs. 209–231.) (6) Draw an outline map of this state like that of Maine, and later do the same for each of the other states.

Tennessee (*Tenn.*). — (7) Where are the mountains? The plains? (8) Name two cities among the mountains. For what is each important? (9) Answer the same question for two other cities in Tennessee. (10) Which city is the largest? (See table, Appendix, p. vi.) (11) What large river drains the state? Through what two large tributaries? (12) What industries in this state?

South Carolina (*S.C.*). — (13) Describe the physiography of this state. (14) What are the principal industries? (15) What city is on the fall line? On the seacoast? For what is each important? (16) Which city is largest?

Georgia (*Ga.*). — (17) Where are the mountains? (18) The plains? (19) What are the industries in each section? (20) Trace the fall line across the state (Fig. 59). What cities are on it? (21) Why is Atlanta situated where it is? (22) How does it compare in size with the largest city in the three states just mentioned? (23) How does it compare in size with New Orleans, Boston, Buffalo, and Providence? (24) Name the two seaports. What do they ship?

Florida (*Fla.*). — (25) Why are there so many lakes in Florida? (See p. 17.) (26) What about the relief? (27) What about the climate? How does this influence the crops? (28) What Florida cities were mentioned, and for what is each important? (29) What mineral product comes from Florida? (30) What is the principal industry at Key West? Why?

Alabama (*Ala.*). — (31) Trace the fall line across this state. What cities are situated on it? (32) Where is Mobile? For what is it important? (33) Describe the location and industries of Birmingham. (34) What crops are raised in Alabama? (35) What cities are engaged in manufacturing cotton? (36) In lumber manufacturing? (37) Compare Mobile in size with Atlanta and Birmingham.

Mississippi (*Miss.*). — (38) Why is there no seaport? (39) In what way can the products of the state be shipped by water? (40) From what cities? (41) What are the products? (42) Why no mining? (43) What reasons can you give why there is so little manufacturing?

Louisiana (*La.*). — (44) State the reasons for the great importance of New Orleans. (45) Why has it a better location than Mobile or Charleston? (46) Compare it in size with those cities. (47) With New York, Boston, and Baltimore.

FIG. 103.

Describe the relief of this section.

FIG. I.

A few of the buildings of the National Soldiers' Home, Dayton, Ohio.

FIG. 104.

MAP QUESTIONS. — (1) Name the large rivers of this group. Draw a sketch map showing them. (2) Draw a sketch map of the five Great Lakes. (3) Locate upon each of those sketches the cities printed in large type (those over two hundred thousand inhabitants) (see Appendix, p. iv). (4) Are any of the very large cities not situated on rivers or lakes? Why? (5) What advantages have these cities from their location? (6) Examine Figure 9 to see

how far the glacier advanced in these states. Do you find any lakes south of that line? (7) What influence must the Great Lakes have upon the summer climate of places near them? Upon the winter climate? (8) Why is the interior colder in winter and warmer in summer than the coast? (9) State some ways in which the Great Lakes must have influenced the development of the West.

FIG. 105.

Map showing the location of Chicago and its relation to the Great Lakes.

(48) What large tributary enters the Mississippi in Louisiana? (49) What crops are raised in Louisiana? Why there? (50) Tell how the delta is caused to grow.

Arkansas (*Ark.*). — (51) What large river enters the Mississippi in this state? (52) There is much forest in Arkansas. In what part should you expect to find most of it? (53) Is Arkansas in the cotton belt? (See Fig. 213.) (54) The capital is the largest city. Compare it in size with Memphis. Why is it less favorably situated than that city? (55) Compare it with New Orleans.

Texas (*Tex.*). — (56) Where are the mountains? (57) Are there forests on the western plains? Why? (58) What are the industries there? (59) What city in the western part? Why there? (60) What are the industries in eastern Texas? (61) What cities are mentioned in the text as being in eastern Texas? (62) For what is Galveston noted? (63) Compare it in size with New Orleans, Charleston, and Boston. (64) Texas is how many times larger than Rhode Island? (For area, see table in Appendix, p. iii.) Than Pennsylvania? (65) Add together the areas of all the New England and Middle Atlantic States, and compare the total with the area of Texas. (66) Compare the population of Texas with that of Massachusetts. (See Appendix, p. iii.) Compare it with that of New York City. (See Appendix, p. vi.)

Oklahoma (*Okla.*). — (67) What about the climate of the western part? (68) What crops are raised in the northern part? In the southern part? (69) Into what river does the territory drain? (70) Name and locate two cities.

General. — (71) Which is the smallest state? (72) Compare it with Pennsylvania and Massachusetts. (73) State the principal industries of the South. (74) Of what advantage is it that they are so different from those of the North? (75) Add together the populations of the ten largest cities, and compare the result with the total for the ten largest in the New England States. (See table, Appendix, pp. iv–vii.)

Suggestions. — (1) What do you know of the negro life and customs of the South? (2) Show several ways in which New England and the Southern States are dependent on each other. (3) What would be the effect on the cotton manufacturing of England if the United States engaged in war with that country? (4) Find what the effect was at the time of the Civil War. (5) Near what places were some of the great battles of the war fought? (6) What other inventions may well be compared with that of the cotton gin in importance? (7) Try raising some rice in the schoolroom. (8) Raise some tobacco, cotton, and sugar cane. (9) About how much sugar does one family use each year? (10) Find out why the cultivation of rice is unhealthful work. (11) Find out something about Indian reservations and the methods employed by the United States to improve the condition of the Indians. (12) What reasons can you give for expecting the cotton mills in New England to prove less profitable, now that the South is developing such mills? (13) Find out how much farther it is from New Orleans to London than from New York. What effect should you think its greater distance from Europe would have on the growth of New Orleans? (14) Through what waters would a boat go from New Orleans to Kansas City? To Pittsburg? To Chicago? To San Francisco?

For References, see *Teacher's Book.*

FIG. 106.

Scenes on a farm in Ohio. Tell what you see in each picture.

VIII. CENTRAL STATES

Physiography and Climate. — A hundred years ago, when a considerable number of pioneers pushed across the Appalachian Mountains into Ohio and Kentucky, they were gladdened by the sight of immense tracts of level land. For hundreds of miles the plains slope gently toward the Mississippi; and then, beyond that river, they slowly rise again for hundreds of miles to the very base of the Rocky Mountains. In a few places, as in western South Dakota and southern Missouri, low mountains rise above the plains; but most of the country is a vast level tract, quite unlike the hilly and mountainous region farther east. What are the names of the mountains of the Central States? (Fig. 104.)

Not only did the settlers find the land level, but most of it was free from forests and boulders. In many portions of New England weeks of hard labor were required to remove the trees from a single acre, and many days to drag away or bury the boulders. On the broad plains, however, such labor was unnecessary, for there were hundreds of thousands of square miles covered only with grass. These treeless plains became known as the *prairies* (p. 26).

While boulders are abundant in some places, the glacier has in most sections left a deep, rich soil, free from stones. The reason for this is, that here the glacier found softer rocks to grind up into soil than in New England, and was therefore more easily able to reduce them to small fragments. In many sections, as in parts of Illinois, Indiana, and Ohio, the glacial drift is one or two hundred feet deep. It is the deposit of this drift which has caused the thousands of lakes in Minnesota and other states.

The summers are too short for cotton, but they are long and hot enough for numerous other crops. The rainfall is also sufficient for crops, except in the extreme western part, which is arid, like western Texas (p. 100).

Settlement of the Mississippi Valley. — The conditions seemed favorable for agriculture; and, in spite of danger from Indians, the settlers poured across the gaps in the mountains, following the Great Lakes or the Ohio River and its tributaries. At first only a few ven-

tured in, traveling until they reached a spot which suited their fancy. There they built rude log huts, and settled down to a solitary existence, one family being perhaps miles away from its nearest neighbor.

As more persons came and wished to proceed farther westward, they built flatboats to navigate the rivers, and they settled in groups along the river banks, forming villages which soon grew into towns and cities. Their life was of the simplest kind, each family depending largely upon itself for whatever it needed (Primary Book, p. 82). Some articles had to be purchased; for though the rich soil produced abundant crops, the pioneers still needed sugar, cotton cloth, tools, and medicines. Since almost all this region drained into the Mississippi, the most accessible place where such supplies could be obtained was New Orleans. Consequently the products of the farm were floated on flatboats to that point, and there sold or exchanged for the articles desired.

A great improvement was made when steam came into use. The first steamboat on these Western rivers was the *New Orleans*, which started out from Pittsburg in 1811. "As it ran down the Ohio, making extraordinary speed in comparison with anything before known, the quiet denizens of the forests along the river banks were amazed and frightened by the strange apparition. Not a few of the more ignorant folk thought the Day of Judgment was at hand, as they watched the showers of sparks and heard the rush of the wheels. And when the craft stopped at Louisville, well along in the night, and let off steam, the roar from the escape pipes brought a good share of the town tumbling out of their beds to see what was the matter."[1]

Canals, similar to the Erie Canal in New York (p. 84), were also made, and the benefits of another invention began to be felt soon after the year 1827. In that year the first railway was built in the United States; and, as years passed, railway lines were so extended that even those regions that were at a distance from the rivers could be reached easily and quickly.

These several improvements in the manner of traveling and carrying freight have exerted an immense influence upon the rapidity with which the Mississippi Valley has been settled. While 150 years had been consumed in pushing the settlements westward to Ohio and Kentucky, it required less than one quarter of that time to extend them twice that distance farther west. Now, in spite of the great cities along the Atlantic coast, more people are living west of Cincinnati than east of it (Figs. 207 and 208), and the greater part

[1] "The United States of America," by N. S. Shaler, Vol. I, p. 296.

of these are in the Mississippi Valley. Altogether, including the Southern States, that valley now supports a population of about 30,000,000. Large numbers of the settlers have come from Europe, especially from Germany, Scandinavia, and Ireland.

Agriculture

Millions of persons in Europe and in our coast cities look to this valley for their bread, meat, and other food, as they look to the South for cotton.

A Farm in Central Ohio. — All the way from eastern Ohio to central Nebraska, agriculture is a very important industry. The farms

Fig. 107.

Threshing wheat on a farm in Ohio.

vary greatly in size, from a few acres to several thousand, but they usually contain from 80 to 160 acres. In the main, they resemble the one in Ohio that is described below.

This Ohio farm of 160 acres has a house upon it in which the family lives, with a barn near by for horses, milch cows, and hay, and with a few sheds around it for grain and farming implements.

A windmill in the rear keeps the milk house well supplied with cold water, and also fills the water troughs in the barnyard. On one side is an orchard having apple, peach, and pear trees, with a few rows of berry bushes in one part, and a chicken house in another, where enough chickens are raised to supply some meat and all the eggs that are needed, with perhaps some to sell. On one side of the front yard are a few beehives, and back of them, between the orchard and the barn, is a garden for vegetables. Still back of that are several pig pens, in which hogs are fattened for home use and also for the market.

Farther away from the house are fields in which there are at least three or four different kinds of crops. Every farmer in that vicinity expects to grow corn, perhaps sixty acres of it, some grass for grazing and for hay, and wheat or some other kind of grain. After these crops are harvested, they are either sold, or fed to stock — horses, cattle, hogs, or sheep — upon the farm. The latter plan is often followed, chiefly because it pays better to fatten stock and sell it than to sell the crops themselves. There are generally two or three good milch cows on hand, which not only supply the family with fresh milk and butter, but furnish some cream or butter to sell.

Since there are only three other houses in sight of this farmhouse, and there is no store or post office nearer than two and a half miles,

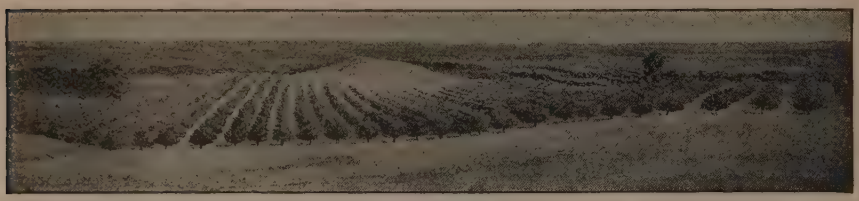


FIG. 108.

A fruit orchard in Kansas.

the farmer and his family may not meet with other persons for several days at a time, although they often see acquaintances driving by. In the busier season, from spring till fall, they make few trips to town. Frequently, however, they have a telephone by which they can talk with neighbors and with friends and merchants in town, while the rural free delivery system brings the post office to their doors.

Some persons would not care for such a life because it is too lonesome, and there is too much hard work connected with it. But this farmer enjoys it greatly, because he likes to take care of his stock, to work in the soil, and to watch the crops grow. In addition to this, he is able to raise most of his own food, and his whole life is more independent than that of persons in a village or city. From such farms have come some of our ablest and best-educated men. Can you name two Presidents who spent their childhood on farms of the Central States? Where were their homes? What can you tell about their early life?

Fruits. — While each farm usually has a small orchard, like the one mentioned above, fruit raising is a special industry in those parts where climate and soil are favorable, as in the neighborhood of the Great Lakes.

The immense area of water renders the summers cooler and the winters warmer than they would otherwise be. Accordingly, we find the Chautauqua grape belt (p. 75) extending from New York a long distance into Ohio; and quantities of such fruit as peaches and apples are produced on the peninsula of Michigan. With what part of the Atlantic coast can this fruit region be best compared? (p. 75.)

Fine Stock in Kentucky. — Kentucky is famous for its blue grass in the neighborhood of LEXINGTON and for its fine stock, especially horses and mules. The reason why this grass is so nourishing is that the Kentucky soil in this section is composed of bits of decayed limestone in which is found an abundance of lime phosphate, an excellent plant food (p. 108). This phosphate is supplied from the shells of small sea animals which were buried in the sea bottom millions of years ago. As the limestone decays, the phosphate mixes with other rock bits and thus fertilizes the soil.

Caverns. — The abundance of limestone in Kentucky is the reason for the numerous caves that exist here. Limestone, although hard, is more easily dissolved by water than other rocks; and as the rain water seeps into the earth and enters the limestone along the joints, it slowly dissolves the rock away. In this manner many a long tunnel has been made, the largest that is known being the Mammoth Cave in Kentucky.

FIG. 109.

A view in one of the Kentucky caverns, showing the icicle-like stalactites, which are made of limy matter deposited by the water which slowly trickles from the cave roof.

Not all parts of Mammoth Cave are yet known, but it is said that there are more than 150 miles of galleries. They are found to wind about irregularly, some being many feet below others, and all together forming a network, or *labyrinth*, into which one dares not venture without a guide. The entire cavern is as dark as any mine, and the only sound to be heard is that of trickling water.

Corn. — Corn raising is one of the most important industries of the Central States (Fig. 209, p. 220). A farmer usually expects to devote from one third to one half of his land to it; therefore, in traveling across these states in summer, one sees corn fields in every direction (Fig. 110).

FIG. 110.

A field in Kansas entirely given over to corn.

The seed is planted in rows in the springtime. Soon the little stalk appears above ground, growing rapidly during the hot summer months, until a height of seven to ten feet is reached. In order to keep the soil soft and kill the weeds, the ground between the rows is plowed when the corn is young; but as it grows higher, the shade of its own leaves protects it both from drought and weeds.

If the stalk is to be used as fodder for cattle in winter, it is cut before frost, when the kernels on the cob are still somewhat soft and milky, although much harder than the green corn which we eat. If left until after frost, the grain hardens, and then the harvest season begins. Men drive into the fields in wagons, and tear the husks from the ear, spending day after day at that kind of work.

FIG. 111.

Two ears of corn, one with the husk stripped down to show the kernels.

Corn is put to many uses. Much that is raised is fed to cattle and hogs, as already stated. Some is made into hominy and breakfast foods, or into corn meal for mush

and corn bread. Starch is another product; but one of the most extensive uses of the grain is in the manufacture of whisky in a *distillery*. There are many distilleries in St. Louis, Louisville, and other cities within the corn belt. Peoria, in central Illinois, is another great center for the manufacture of whisky and other materials, from corn. Much corn is shipped eastward to the seaboard and beyond, and all the cities along the way make profit from handling it.

Wheat. — This grain, like corn, is produced in all the Central States as well as in other parts of the country (Fig. 211, p. 221). It is an especially important product in Kansas, Ohio, and Indiana; but the section which at present is most noted for wheat is the valley of the Red River of the North. In this valley is a strip of land, including western Minnesota, eastern Dakota, and a portion of Manitoba, which is one of the finest wheat regions in the world.

One of the reasons for its fertility dates back to the time when the glacier was melting away from this region. The ice then stretched across the Red River valley, and forced that river to seek an outlet southward. A broad lake was thus formed, with an ice dam on the north, and in the water of this lake the sediment was deposited which forms much of the soil of the wheat region. When the ice melted entirely away from the valley, the Red River was once more able to flow northward, and then the lake disappeared.

The land there is almost as level as the surface of the sea; it is so level, in fact, that after a rain the water stands in shallow sheets in the fields. It is necessary to elevate the roads a foot or more above the surrounding land, with ditches on either side. In every direction there is nothing to break the view except a farmhouse every half mile or so, with a few trees around it. Over these open plains the wind sweeps with terrific force, somewhat as upon the ocean, and fierce, blinding snow squalls, or *blizzards*, are not uncommon.

Upon these plains one may ride northward on the train toward Winnipeg all day long, and see scarcely a single crop besides wheat. Most of the farms are of moderate size, but some are enormous. For example, the Dalrymple farm, at Casselton, North Dakota, contains fifteen thousand acres. How many square miles is that?

This farm is divided into six parts, with farm buildings upon each. To prepare the ground, from fifteen to twenty men at a time plow and sow the seed on each division. One takes the lead, the next follows close behind, then comes the third, fourth, and so on. The grain is harvested on a similar plan (Fig. 112). One hundred and twenty men and three

hundred horses are employed in the planting season, and three hundred men during the harvest. As one acre usually produces from fifteen to twenty bushels, an immense amount of grain is obtained from this one farm. How many pounds per acre would this be?

The great quantity of wheat produced in the Red River valley of the North and the neighboring region has helped in the growth of the cities of MINNEAPOLIS, ST. PAUL, and DULUTH, and scores of others along the Great Lakes, the Mississippi River, and even on the Atlantic coast.

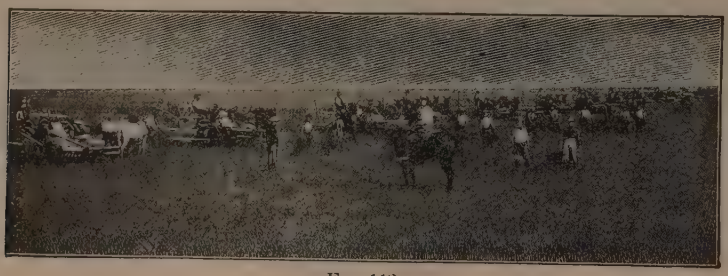


FIG. 112.

Harvesting wheat in the Red River valley.

Other Grains. — Besides corn and wheat, two other grains are raised in great quantities in these states; namely, oats and barley. The former is a common food for horses, but the latter is largely used in the manufacture of beer. The great breweries, to be seen in every large city, consume immense quantities of barley in order to obtain the *malt* which is needed in making beer. In CINCINNATI and ST. LOUIS, and in many other places, beer making is one of the important industries. MILWAUKEE is also noted for beer, much as PEORIA is for distilled spirits.

Cattle Ranching. — After passing westward from the fertile Red River valley of the North, one finds the farmhouses diminishing in number, and the country becoming more and more arid, until, beyond the 100th meridian, there is practically no farming without irrigation. At the same time one gradually rises higher and higher, until, near the base of the mountains, he has reached an elevation of fully a mile above the sea. This dry plateau, extending from Canada to southwestern Texas (p. 99), is commonly known as the *Great Plains*.

The entire semi-arid western third of the western tier of states — from Texas to North Dakota — is therefore devoted chiefly to ranch-

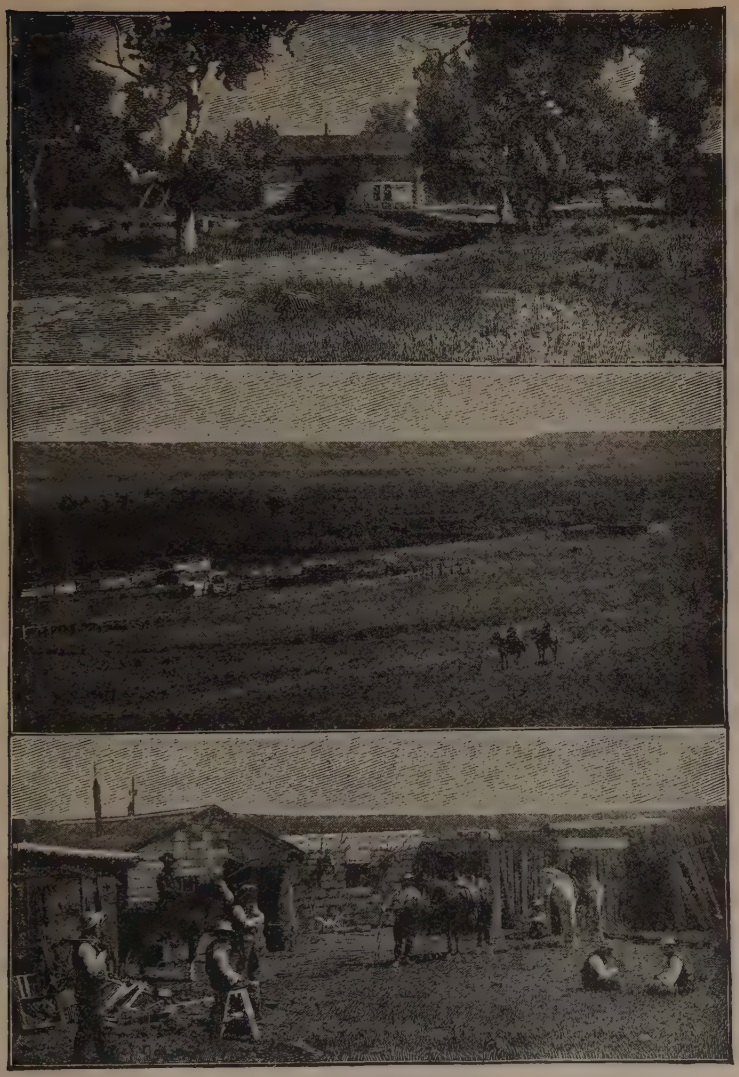


FIG. 113.

Scenes in the ranch country. Upper picture, a typical ranch house on the banks of a stream in western North Dakota. Middle picture, a ranch house and "the range." Lower picture, a group of cowboys at the ranch house.

ing. Following is a description of ranch life in western North Dakota, which much resembles such life in other states : —

There is little water anywhere else than in the widely separated streams; and there are almost no trees except upon their banks. As the ranchman

FIG. 114.

A scene during a round-up, when great numbers of cattle are bunched together.

must have both water and timber, he locates his house (Fig. 113), with its few stockades or *corrals*, and sheds, within easy reach of these necessities. If there is no neighbor within several miles, it is all the better, for his cattle are then more certain of abundant grass.

A single ranchman may own from ten to twenty thousand head, and yet they are all allowed to wander about upon public land, called "the

FIG. 115.

Picture showing the mother with her brand, a calf following her, and a cowboy about to catch the calf and brand it.

range." Usually they keep within a distance of thirty miles of the ranch house; but sometimes they stray one or two hundred miles away.

Twice a year there is a general collection, or *round-up* (Fig. 114), of cattle, — the first round-up occurring in May or June, and the other early in the fall. One object of the first is to find the calves that have been born during the winter.

Since there are few fences, cattle belonging to ranches which are even a hundred miles apart become mixed during the winter, and those in a large herd may belong to a score of different ranchmen. Each cattleman has a certain mark, or *brand* (Fig. 115), such as a letter, a cross, a horseshoe, or some other device, which must be burnt into the skin of each of the cattle.

A round-up, which lasts several weeks, is planned by a number of ranchmen together. A squad of perhaps twenty cowboys, accompanied by a wagon and provisions, a large number of riding horses, or "ponies," and a cook, go in one direction, and other wagons with similar outfits set out in other directions. Before separating in the morning, the members of a squad agree upon a certain camping place for the night, and then they scour the country to bring the cattle together, riding perhaps sixty or eighty miles during the day. Each ranchman knows his own cattle by the brand they bear; and since the calves follow their mothers (Fig. 115), there is no difficulty in determining what brand they shall receive. After branding the calves, each ranchman drives his cattle homeward to feed during the summer within a few dozen miles of their owner's home.

Fig. 116.

A cowboy with his rope, or *lariat*, with which he captures the cattle by throwing a noose over their necks or around their legs.

The second large round-up is similar to the first, except that its object is to bring together the *steers*, or male cattle, and ship them away to market; it is accordingly called the *beef round-up*. A ranchman who owns twenty thousand cattle may sell nearly half that number in a season. As the steers are collected they are loaded upon trains and shipped to Omaha, Kansas City, St. Louis, Chicago, and even farther east. Millions of cattle are slaughtered every year in these cities (Fig. 122), and the meat is sent to England and Germany, as well as to all parts of the United States.

Very often the cattle find so little water, and such poor pasturage, that they fail to fatten properly, and must be fed for a time. This may be done upon the irrigated fields near the rivers in the ranch country, or on the farms farther east, as in Kansas, Iowa, and Nebraska, and even in Illi-

nois, Indiana, and Ohio. Thus we see how a great product of one section of the United States is made to furnish employment and food for millions of persons far away.

The lives of ranchmen and cowboys are exciting and interesting, most of each day being spent in the saddle (Fig. 116). They are so far separated from other people that they must take care of themselves in a surprising number of ways. For instance, a ranchman must build his own house, kill his own beef and dress it, put up his own ice, raise his own vegetables, do his own blacksmithing, find his own fuel, and even keep school for his children if the latter receive an education. He affords a good example of the pioneer life in early days.

Lumbering. — Although so much of the land is under cultivation, or given over to ranching, forests are found in many sections. When

FIG. 117.

Floating timber on a stream in Wisconsin.

the region was first visited, most of Minnesota, Wisconsin, and Michigan was tree-covered, as well as much of Ohio, southern Indiana, and Illinois, and the Black Hills of western South Dakota. Even now some forest is left, although there has been so much lumbering that large areas have been entirely cleared.

In Wisconsin, for instance, in traveling northward from the well-cultivated southern portion, one comes to a section where farmers are just taking the place of lumbermen. Many log huts stand there in small clearings, with the green fields still dotted by tree stumps; but beyond, little else than woods can be seen. In these forests are many different kinds of northern trees, especially the evergreens, such as hemlock, spruce, white pine, and cedar, and scattered hardwoods, such as oak, birch, and maple.

In the neighborhood of the Great Lakes lumbering is actively carried on, and in much the same manner as in Maine (Fig. 117),

although a great deal of the timber is brought to the sawmills by wagons or rail, instead of being floated a long distance down stream. The excellent water power in the Mississippi River at MINNEAPOLIS early attracted large sawmills and made that city famous for lumber (Fig. 127, p. 141). Other mills are situated farther down the Mississippi, as at WINONA. They are also numerous at DULUTH, and at SUPERIOR, which is just across the state line in Wisconsin.

Near the forest regions, along the streams and on the shores of the Great Lakes, the manufacture of furniture and other articles of wood is an important industry. CHICAGO is especially noted for its

FIG. 118.

A sawmill in Wisconsin.

manufacture of furniture; and on many of the small streams of Minnesota, Wisconsin (Fig. 118), and Michigan, where there is water power, there are sawmills, furniture factories, and planing mills. Some of these are at LA CROSSE and OSHKOSH in Wisconsin, and SAGINAW, BAY CITY, and GRAND RAPIDS in Michigan. Many school desks are made at the last place.

MINERAL PRODUCTS

Building Stone. — It has been stated (pp. 3 and 5) that the ocean once covered much of this section, and that layers of sediment deposited under the water have hardened into rock strata, which have been raised to form the dry land. During their uplifting they were not folded and broken, as

mountain rocks are, but the layers were left in a horizontal position, as when first laid down in the ocean. The streams, cutting their valleys downward through the soil, have brought many of these rock strata to light, and among them are beds of limestone and sandstone which are of value as building stones.

Ohio and Indiana are especially noted for their limestone and sandstone, which are shipped in all directions for building purposes. There are also slates and granites in the hilly and mountainous sections, as there are in hilly and mountainous New England (p. 53).

Petroleum and Natural Gas. — Power for manufacturing is also abundantly provided in this region. When oil and natural gas were first discovered in New York and Pennsylvania, it was supposed that they did not exist elsewhere; but great quantities of both these substances are now obtained in Ohio, Indiana, West Virginia, Texas, Kansas, Oklahoma, California, and other states. Many farmers whose land is capable of producing only the usual crops have suddenly become rich by the discovery of oil or gas in the rocks far beneath the soil. In fact, these materials are so abundant in some places, that towns have sprung up like mushrooms, — as FINDLAY in western Ohio. The way in which gas and oil are formed, and the uses to which they are put, have already been described (p. 78).

Coal. — This mineral fuel is much more widespread in the Central States than oil and gas. In some places the beds lie near the surface, like rock in quarries, and then coal mining is very simple; in others it is buried so deep that long shafts must be sunk to reach it. Being so valuable a fuel for houses and manufactories, the coal is mined in many places.

While Pennsylvania produces two kinds of coal, anthracite and bituminous, the Central States have only the latter variety. It is bituminous coal that is used in making coke; and because there is so much of this kind of coal, many of the cities of these states are engaged in iron manufacturing. Soft coal produces more smoke than the hard anthracite, and those cities which burn great quantities of it are very sooty in consequence.

Iron Ore. — Formerly Pennsylvania was the chief iron-producing state, having both coal and iron ore; but in recent years explorers in the forest wilderness northwest of Lake Michigan, and near the western end of Lake Superior, have discovered what seem to be inexhaustible beds of iron ore. In some places the ore is so soft that, like clay, it can be dug out by steam shovels, and so near the surface

that the mines are open pits (Fig. 119). That is the case, for example, at ISHPEMING, in northern Michigan.

This Lake Superior district is now the leading iron-producing center in the world. The main difficulty, however, is the fact that there is no coal in that region. Consequently, in order that the ore may be reduced to the metal, either coal must be transported thither, or the ore must be carried to the coal regions. The latter process has proved the cheaper.

FIG. 119.

An open iron mine.

Fortunately the ore deposits are located near waterways.

The ore is mined, loaded upon cars, and sent over short lines of railway to the lake shore, where it is distributed by vessels to manufacturing centers.

Boats with such a cargo set out from the lake ports of DULUTH, SUPERIOR, ASHLAND, and MARQUETTE for manufacturing centers

FIG. 120.

Iron ore docks at Conneaut, Ohio.

all along the lakes. As the ore must reach a point where coal is easily obtained, it is taken to CHICAGO, DETROIT, CLEVELAND, BUFFALO, etc. Notice how close to these cities the coal beds extend (Fig. 220).

The Lake Superior iron district is in three states, — Michigan, Wisconsin, and Minnesota, the most important being Michigan (Fig. 222), and the least important Wisconsin. These three states together produce seventeen times as much ore as Pennsylvania. The sudden development of mining in this region has brought so many people that numerous towns and cities have grown up; but the lack of coal has prevented much iron manfacturing.

Copper. — Another very important metal found in the Central States is copper. This occurs in the pores of a lava rock and between the grains of a pebble beach which, though now hardened into rock, was formed in the ancient sea. Indians and the early explorers found fragments of copper on the surface, and mines were later opened in the lava and beach rocks of the small peninsula marked Mineral Range on the map (Fig. 104).

Some of these mines are very deep, one of the shafts reaching to a depth of about a mile. When the ore is drawn to the surface, it is found mixed with so much beach rock and lava, that it must be crushed to a powder under powerful hammers, or *stamps;* then water is run over it in order to carry away the bits of rock and leave the heavier particles of copper. Even after this, some foreign substances are still mixed with the copper. Since the purposes for which this metal is used demand that it be very pure, it must next be placed in a large *smelter* to be melted and thus separated from the impurities. Among the latter is a little silver, which is saved. The pure copper is allowed to run out of the furnace and cool in bars to be shipped away.

The largest mines in this region are near together, and so many men are required to obtain the ore, and change it to pure metal, that towns of large size have grown up in a wilderness which otherwise could scarcely have attracted many people. Within a few miles of two or three of the most important mines is a number of towns having a total population of fifty thousand, the largest being CALUMET. Many of these persons are miners and families of miners; but there must, of course, be storekeepers, physicians, teachers, ministers, etc., and they all depend for a living upon the precious copper buried far beneath the surface.

Copper is valuable in many ways. It is one of the metals used to make bronze, and also brass; but of late years the wide introduction of electricity has created a new and even greater demand for this

metal. Since copper is a substance which transmits electricity with much less resistance than other common metals, it is the best material for trolley wires, the wire of long distance telephones, electric bells in houses, etc. In every city in the land much copper is used.

As in the case of iron ore, the metal is shipped to points along the lakes, and elsewhere, by water and by rail, much of it going to the metal manufactories in the New England cities (p. 61). Name some goods that must be shipped *into* this section instead of away from it.

Lead, Zinc, etc. — Lead and zinc, two other metals found in the Central States, occur together in pockets and little veins, in layers of limestone. The ores are mined in many places, as at JOPLIN, Missouri, and then sent to the proper kind of furnaces, where the pure metals are extracted.

A large part of our supply of lead and zinc is obtained from Missouri, Kansas, Wisconsin, and Iowa, the first-named state producing more zinc than any other in the Union. For what purposes are lead and zinc used? Of what use should you think this lead was to the early pioneers?

Besides these metals, *gold* is mined in considerable quantities in the Black Hills in the extreme western part of South Dakota.

Much *salt* is also obtained in the Central States, especially in Michigan and Kansas.

Clays. — The deep soil left in the prairie states by the glacier is often a clay which is useful in the manufacture of bricks; and, as in other sections of the country (p. 83), there are many brickyards, especially near the large cities. From this same kind of clay, other articles, such as flower pots and drain pipes, are manufactured. During recent years, when drainage of farm land has become so common, the manufacture of tile for that purpose has developed into a great industry, many a small town having a tile factory. These objects are made in much the same manner as brick (p. 83), except that the clay is pressed into other forms.

There is a number of places where fine pottery also is made. For instance, the very high grade, known as Rookwood ware, is manufactured in CINCINNATI. The best of clay is needed for this, and some of it must be brought from a distance. The first step in making a vase is to wet a lump of clay so that it may easily be molded. Then it is shaped upon a rapidly revolving wheel, known as the potter's wheel (Fig. 74), which has been in use for centuries. There it is whirled rapidly round while a man molds it with his hands, in a very few minutes changing a shapeless lump into a delicately formed vase. It must then be baked. After the baking, flowers or other ornaments may be painted upon it. The surface is finally covered with a substance which, when baked, produces a *glaze*. One of the beauties of the Rookwood ware is the peculiar color of the glaze, which is a dark brown or yellowish brown.

Principal Cities and Shipping Routes

It is evident that the raw products of the farms, ranches, forests, and mines in the Central States must lead to much commerce; and that, since coal is included among the raw products, manufacturing must also be developed. This means, of course, that there must be many large cities; and since the Central States have no ocean coast, we naturally find them along the Great Lakes and the three great rivers, — the Mississippi, Ohio, and Missouri, — where it is possible to ship goods by water. Let us first consider those along the Great Lakes.

THE LAKE CITIES

Duluth and Superior. — At the western end of Lake Superior there is a fine, large harbor, one side being in Minnesota, the other in Wisconsin. Upon this harbor are two cities, Duluth and Superior,

Fig. 121.

Lake vessels, the one in front being called a whaleback.

which together have a total population of about one hundred thousand. The chief products of this vicinity are iron, lumber, and wheat, which are shipped eastward in immense quantities from these two ports. Owing to the neighborhood of the Minnesota and Dakota wheat fields, there are enormous elevators at Duluth for storing grain, and flour mills for grinding it up. The iron ore docks, sawmills, and lumber wharves are also busy places.

Goods are shipped *to* this point as well as away from it; for while the people in this section have some materials to spare, they also need many others, as farming implements, clothing, various kinds of food, furniture, and coal. These goods are brought cheaply, because the vessels carrying

ore, wheat, and lumber eastward must have something to bring back. As already suggested (p. 83), it is the needs and products of the inhabitants of this distant region that help to make Buffalo, Montreal, and New York so important, and to keep the mills and factories of New England so busy. Explain how this is true.

At the outlet of Lake Superior into Lake Huron there are rapids which interfere with navigation; and to avoid these a ship canal, called the Sault Ste. Marie, or "Soo," canal, has been dug. On its banks is a city of the same name.

Chicago. — While Lake Superior extends far into the Central States in one direction, Lake Michigan reaches a long way in another; and near its southern extremity, in Illinois, the great city of CHICAGO is situated. At this point the small Chicago River empties into the lake, forming a small harbor, and in early times a fort was located there. The harbor itself was formed thousands of years ago while the great glacier was melting away. At that time the ice sheet lay across Lake Michigan, forming a huge dam which prevented the waters from flowing into Lake Huron and the St. Lawrence River. This compelled the water to find an outlet southward, past the present site of Chicago, and into the Illinois River and the Mississippi. It was the wash of this water which dug out the small harbor.

As the West developed, this site proved to be a most advantageous one; for whenever a railway was built from the East to the Northwest, from any place north of Washington, it was necessary for it to pass around the southern end of Lake Michigan. Of course, as the city grew in size, other railways were built to it *because* it was large; and now they approach it from the East, West, North, and South (Fig. 105).

Chicago is the nearest lake port to the most productive grain region in the world, and it is therefore an important shipping point for grain. It is also within easy reach of the coal fields, while lumber and iron ore are readily brought to it by boat. These facts have caused Chicago to grow with wonderful rapidity, so that it has long since outgrown its small natural harbor, which has been enlarged by extensive breakwaters. In the year 1840, there were but 4470 inhabitants; in 1870, 300,000; in 1900, 1,698,575. To-day Chicago is the second city in size in the New World.

Stock Yards of Chicago. — Chicago is not only a great grain market, but also the most important meat market in the world. All

the grazing states of the West ship stock to this point, and in the city itself nearly a square mile is taken up by the Union Stock Yards, consisting of large sheds, pens with high fences, and troughs for food and water (Fig. 122). Train loads of cattle, hogs, and sheep are unloaded there every day. The work employs about thirty thousand men, which indicates how extensive it is.

The products of the packing houses are several. By far the most important is meat; and so well developed is the industry that most of the cities of the East are furnished with fresh meat from

FIG. 122.

The Chicago stock yards.

the Western cities. It may be several weeks after the meat is prepared for food before it reaches the table; yet all this time it is kept fresh by the use of ice. Special refrigerator cars are constructed for the purpose of carrying it.

Besides what is sold fresh, a great deal is canned. The fat of the hog is made into lard, and not a little beef fat is converted into imitation butter, such as oleomargarine. From the bones, also, valuable products are obtained. Many of the bones are burned and used in the manufacture of sugar (p. 106); and the horns and hoofs are of use in making gelatine and glue.

The hides are made into shoes, gloves, harness, and other goods. From the Western packing houses the great shoe factories of Lynn, Haverhill, and Brockton, in Massachusetts, as well as those in other parts of the country, are supplied with much of their leather. The

hides, however, must first be sent to tanneries. One of the principal places for tanneries is MILWAUKEE, which is supplied with tannic acid from the bark of the hemlock tree that grows in the forests of Wisconsin. Nothing is wasted in the packing business; even the bristles of the hog are saved to make brushes; and the hair removed from the hides of cattle is valuable in making plaster.

FIG. 123.

A lake steamer at Chicago.

Manufacturing in Chicago. — Being near the forest regions, Chicago has become a lumber market; and iron ore is also easily brought by boat. Therefore, the opportunities for manufacturing are excellent; for, although there is no natural water power in that vicinity, vast coal fields are not far away.

Other Facts about Chicago. — The sewage from the city has heretofore been emptied into Lake Michigan; but as the drinking water must be taken from the lake, it became necessary to dispose of the sewage in some other way. For that purpose an immense drainage canal has recently been completed (Fig. 104), connecting Lake Michigan with the Illinois River, and thus setting the current toward the Mississippi and the Gulf of Mexico. This drainage canal, which is wide and deep enough for vessels, will undoubtedly develop into a ship canal. In that case, large boats may reach Chicago from the Gulf of Mexico as they now do from the Gulf of St. Lawrence. What effect would this have upon the city?

One of the chief educational institutions is the University of Chicago (Fig. 124 A), established in 1890, another is the Northwestern University (Fig. 124 B) at Evanston, a suburb of Chicago. Mention some other large universities.

Other Cities along the Lakes. — Other great cities along the lakes are engaged in many of the same industries as Chicago, and need not be so fully described. MILWAUKEE (Fig. 105), the largest in Wisconsin, deals extensively in grain, lumber, and leather, packs much pork, and manufactures a great quantity of flour and machinery. Its immense breweries have already been mentioned (p. 126).

FIG. 124 A.

Mitchell Tower, University of Chicago, from Hull Court, looking east.

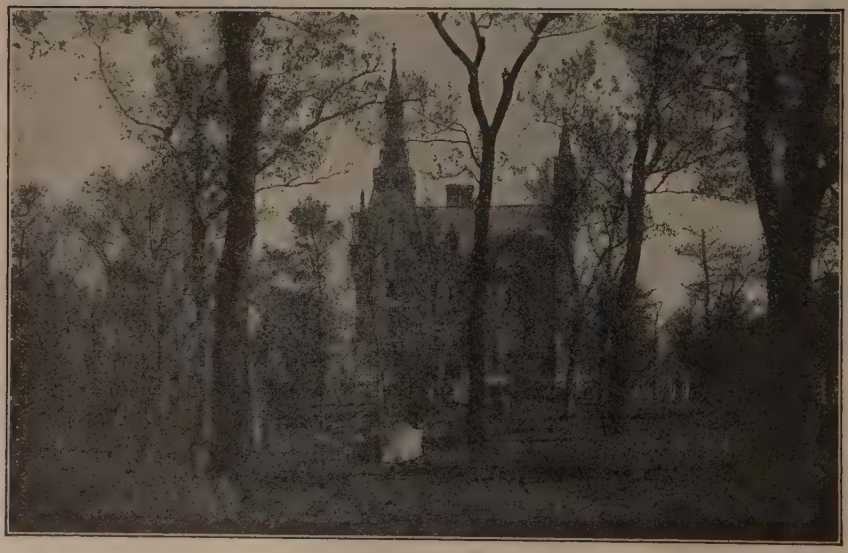


FIG. 124 B.

University Hall, Northwestern University, Evanston, Ill.

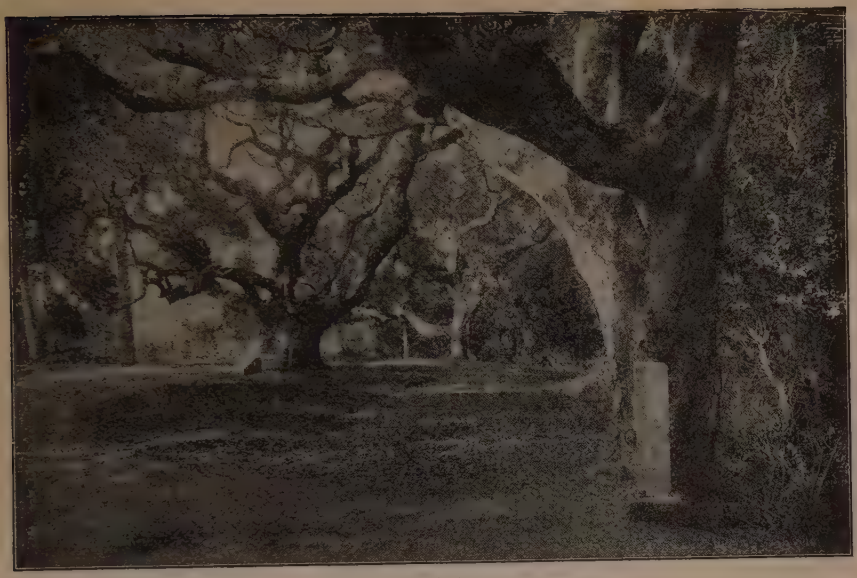


FIG. 125 A.

"Le Conte Oaks," University of California.

FIG. 125 B.

View of Arcade, Leland Stanford University.

Detroit (Fig. 105), the largest city in Michigan, is also on the Great Lakes water route. The name is a French word for strait. Why suitable here? All vessels going east or west must pass this city; and some of the railway trains from eastern Canada to Chicago and the West are ferried across the strait at this narrow point. Detroit is consequently a shipping and manufacturing center, dealing in grain, wool, pork, and ores from the West, and making iron and steel goods, such as cars, stoves, etc.

Not far away, at Ann Arbor, is the University of Michigan, one of the largest educational institutions in the United States. It is supported by the state; in fact, state universities are established in most of the Central, Southern, and Western States.

On the lake shore in Ohio the chief cities are Toledo and Cleveland (Fig. 105). The former has extensive flour mills and iron manufactories; and the latter, which is much the larger, and larger than either Cincinnati, Detroit, or Buffalo, has an important trade in grain, lumber, and ore. Being near the coal and petroleum fields, Cleveland is extensively engaged in manufacturing machinery and furniture, in refining petroleum, and in ship building for the lake commerce. It is one of the busiest and most rapidly growing of the lake cities.

THE RIVER CITIES

Cities along the Mississippi. — The largest city on the rivers, corresponding to Chicago on the lakes, is St. Louis in Missouri (Fig. 104). It has a very favorable position in the center of the productive Mississippi Valley. This, together with the fact that it is situated on the Mississippi near the mouth of its two largest tributaries, secures for it a large amount of trade both by water and by rail. The railway bridges across the Mississippi at this point have also had an immense influence on the growth of the city.

Fig. 126.

The Pillsbury-Washburn flour mills at Minneapolis.

Like Chicago, St. Louis is an important market for grain and live stock; but being so far south, it also trades extensively in Southern products, especially cotton and tobacco. This city is also a noted mule and horse market, and a great manufacturing center. It manufactures immense quantities of tobacco, beer, flour, boots, shoes, clothing, and hardware.

Formerly Chicago and St. Louis were almost the only noted markets for grain and live stock in the West; but in later years several other cities have become prominent in that section. Two of these are the "twin cities," MINNEAPOLIS and ST. PAUL (Fig. 104). The latter, the capital of Minnesota, is a trade center. From it the products of the West are sent eastward and southward, while farming implements, furniture, clothing, and other articles are distributed among the smaller towns of the vast farming region round about.

MINNEAPOLIS, only ten miles distant, is situated at the Falls of St. Anthony, which furnish splendid water power. It is also in the

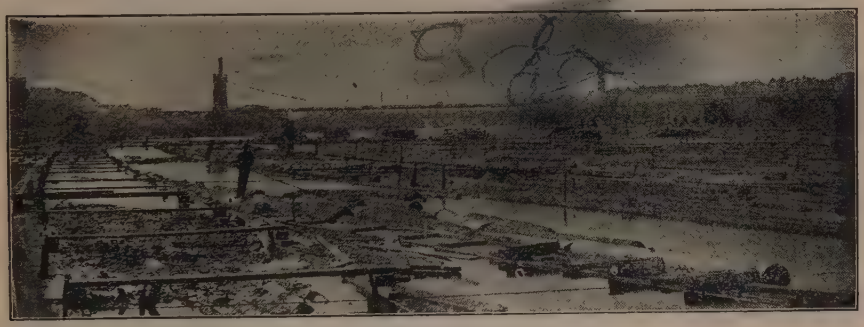


FIG. 127.

Logs in the river near Minneapolis. One of the bridges across the Mississippi River at this point is seen in the background.

midst of the wheat region; and this, with its water power, has caused Minneapolis to become the leading flour-producing center in America. In the city are many grain elevators and flour mills (Fig. 126).

One of these flour mills, belonging to the Pillsbury-Washburn Company, is the largest in the world. Steam shovels scoop the grain from the trains very rapidly, emptying a car of 750 bushels in eighteen to nineteen minutes. All straw, useless seeds, sticks, etc., must first be separated from the grain, and then it passes through many different machines before the pure flour is produced. During this process it must

be raised to the top of the building twelve different times, being carried up by rapidly moving belts having many small buckets, or pockets, attached.

In making flour a thin covering called bran is first removed from the outside of the kernels. Between this covering and the center is the part from which the fine flour is made, and the center is the germ which is separated and used as a breakfast food. All this is accomplished by machinery, as is the sacking, or barreling, and loading on the cars.

What have you already learned about the influence of St. Anthony's Falls on the lumber industry of Minneapolis?

Cities along the Missouri. — The leading cities on the Missouri River are OMAHA in Nebraska and KANSAS CITY (Fig. 104) in western Missouri. Each is surrounded by a fertile farming country

FIG. 128.

Hogs in Kansas being fattened for the market.

which produces much grain. Each is also a market for cattle, sheep, and horses raised near by and in the semi-arid region farther west. Being so near the ranch country, both of these cities have a certain advantage over St. Louis and Chicago, and their meat-packing industry is gaining rapidly each year. This industry is most important at KANSAS CITY, Kansas.

Southwest of Omaha is LINCOLN, the capital of Nebraska; and across the river in Iowa is COUNCIL BLUFFS, an important center for farming implements. Several cities northwest of this point are chiefly important as trade centers. Find some of them on the map. On the river above Kansas City is ST. JOSEPH in Missouri, and below it is JEFFERSON CITY, the capital of that state. Opposite is KANSAS CITY, Kansas. Farther

west, in Kansas, are WICHITA, and TOPEKA the capital. Since we know the products of this section, it is clear why most of the larger cities are centers for stock, grain, and flour.

Cities in the Ohio Valley. — In the Middle Atlantic States, the cities of the upper Ohio — Pittsburg, Allegheny, and Wheeling — owe their importance largely to coal and iron, and to the fact that river boats can reach them.

Farther down, CINCINNATI (Fig. 104), the largest river port in the state of Ohio, is a great manufacturing center. Besides pottery

FIG. 129.

River boats on the Ohio at Cincinnati.

(p. 135), this city manufactures large quantities of iron, machinery, and clothing. COLUMBUS, the capital, is an important trade center, and manufactures carriages, wagons, and other articles. The reasons why this city is engaged in the manufacture of carriages and farm machinery are, first, the presence of the necessary raw materials, such as iron ore, coal, and hard wood; and, secondly, the many farms upon which these articles are needed.

Farther down the river is LOUISVILLE, the largest city in Kentucky. There are rapids in the Ohio at this point, and a canal leads

around them. Besides being a center for tobacco, like Richmond and St. Louis, Louisville manufactures iron goods, farming implements, flour, and leather goods. It is also a railway center.

Evansville, the largest river port in Indiana, is principally engaged in the manufacture of flour, machinery, and leather goods. Indianapolis, the capital and metropolis of Indiana, is in the midst of a splendid farming district. It is a railway and trade center like Columbus, and handles much grain, lumber, and furniture.

QUESTIONS AND SUGGESTIONS

Review Questions and Topics. — (1) Describe the physiography: — the plains; the mountains; the prairies; the soil. (2) What about the climate of the section? (3) Tell about the settlement of the Mississippi Valley: — first pioneers; use of the rivers; steamboats; canals and railways; rapid settlement in later years; population. (4) Describe the farm in Ohio: — its size; the buildings; the products; life on the farm. Would you care to live there? Why? (5) What fruits are raised, and where? (6) Where is tobacco raised, and what cities are engaged in its manufacture? (7) What kinds of stock are raised in Kentucky? What is the reason for their fine grade? (8) Describe the Mammoth Cave. (9) Tell about corn: — the planting; the care of the field; uses of corn; cities which handle the corn. (10) Where is wheat raised? (11) Describe the Red River valley of the North. (12) Tell about wheat raising on the Dalrymple farm. (13) What cities have been influenced by this wheat region? (14) What other grains are raised? For what are they used? In what cities? (15) Describe cattle ranching: — where carried on; reason; the cattle ranch; wandering of the cattle; object and nature of the spring round-up; of the beef round-up; what is done with the cattle; the life of the cowboys. (16) Where are the forests? (17) What kinds of trees are found? (18) How is the lumbering carried on? (19) What cities are engaged in lumbering? In the manufacture of articles from wood? (20) What is the origin of the building stones? What kinds are found? Where? (21) Where are oil and gas obtained? Of what use are they? (22) Where is coal found? To what uses put? (23) Tell about the iron mining: — its development; nature of the ore; where sent; reason; manner of loading the vessels; cities sent from and shipped to; states producing it. (24) Study about copper: — where found; how found; mining; obtaining the metal from the ore; towns near the mines; uses of copper. (25) What other minerals are obtained? Where? (26) What clay products are manufactured? (27) Where is Rookwood ware made? How? (28) Where are the principal cities to be looked for? Why? (29) What cities at the western end of Lake Superior? For what are they important? (30) Give the reasons for the location of Chicago and its wonderful growth. (31) Describe meat packing in Chicago. (32) To what uses are the various products put? (33) What manufacturing is carried on in Chicago? Why? (34) State some other facts about Chicago. (35) Briefly enumerate the important facts about Chicago. (36) What other Great Lake cities are there? For what is each important? (37) Name the cities along the Mississippi River, and tell for what each is important. (38) Describe flour milling. (39) Name the cities along the Missouri. For what is each important? (40) Do the same for the Ohio valley.

Review by States: *Ohio* (*O.*).— (1) Name the four largest cities. (Appendix, pp. iv–vi.) Where is each located? Why there? (2) What other cities of Ohio are mentioned? For what is each important? (3) Why is there much manufacturing in this state? (4) What other industries are mentioned in the text? (5) Examine the maps (Figs. 209 to 216) in order to see what crops are raised in Ohio. (6) In what ways are the cities of Ohio dependent upon New Orleans and New York? How are the latter cities dependent upon those in Ohio? (7) Of what service to Cleveland and Toledo is the Erie Canal? (8) Draw a sketch map of Ohio like that of Maine (p. 65). As you study each state do the same.

Indiana (*Ind.*). — (9) Examine the maps (Figs. 209 to 216) to see what crops are produced in Indiana. (10) Which is the largest city? For what noted? (11) What other cities were mentioned? (12) What are the industries of Indiana? (13) Examine the relief map to see if the relief seems favorable to farming. What other Central States resemble this in relief? (14) Of what importance was the fact that so large a part of this section was treeless when discovered?

Kentucky (*Ky.*). — (15) Why should this state be better adapted to tobacco raising than Ohio? (16) Of what importance is the limestone of Kentucky? (17) Where are most of the cities? Why there? (18) What products are mentioned from Kentucky? (19) Which is the largest city? For what important? (20) What other cities are mentioned?

Illinois (*Ill.*). — (21) What industries are mentioned from this state? (22) Examine the maps (Figs. 209 to 216) to see what crops are raised. (23) Why is there much manufacturing in Illinois? What kinds are carried on? (24) Of what value is the lake to manufacturing? (25) State the reasons why Chicago has developed so greatly. (26) What other cities are mentioned in this state? For what is each important? (27) In the Appendix (pp. iv–vii) find the population of the three largest cities of each of the four states so far reviewed, and compare them. (28) Which of these four states is the largest? Which smallest? (Appendix, p. iii.)

Michigan (*Mich.*). — (29) What lakes does this state border? Of what advantage is this? (30) What disadvantage can you see in the fact that water separates the lower from the upper peninsula of Michigan? (31) Ice stops lake traffic in winter. What effect must this have? (32) Into what waters does this state drain? Contrast this with the other states. (33) Where are most of the large cities? Why there? (34) For what is each important? (35) Give the reasons for the location of Detroit. (36) What are the important products of Michigan?

Wisconsin (*Wis.*). — (37) Which is the largest city in this state? For what important? (38) What other cities are mentioned in the text? What is done in each? (39) Compare Wisconsin with Michigan in relief; in industries; in mineral products; in crops; in the size of cities. (40) What effect must the lakes have upon the climate? Would this influence be greater or less than in Michigan? Why? (41) If there were coal beds in northern Wisconsin, what effect might it have upon Chicago, Cleveland, and the coal mining of Pennsylvania?

Minnesota (*Minn.*). — (42) Where does the Mississippi River rise? (43) What oceans receive the waters that fall upon Minnesota? Through what rivers? (44) What industries are carried on in this state? (45) What crops are raised? (46) Name the three largest cities, and tell why each is important. (47) How does the largest compare with Boston? With Cincinnati?

Iowa (*Ia.*). — (48) Examine the maps (Figs. 209 to 216) to see what crops are raised in this state. (49) What other important industries are carried on?

(50) Name the largest cities. For what are they noted? (51) Much corn is raised here; what must be done with it?

Missouri (Mo.). — (52) Examine Figures 209 to 216 to see how the crops of Missouri differ from those of Minnesota. Why is there this difference? (53) Why are so few towns found in the southwestern part? (54) Name and locate the two largest cities. For what is each important? (55) What other cities are mentioned? (56) Find the population of St. Louis; compare it with New York, Chicago, Philadelphia, and Boston. (57) Give reasons for its great size.

Kansas (Kan.). — (58) Why are the cities in the eastern part? (59) What are the industries of the west? Why? (60) What crops are raised in Kansas? (Figs. 212 to 218.) (61) Name the principal cities. For what is each noted?

Nebraska (Neb.). — (62) How do the industries of Nebraska compare with those of Kansas? Why? (63) How are these states alike in regard to location of cities? (64) What cities in Nebraska are mentioned? (65) For what is Omaha noted? Why may we expect it to increase in importance in this respect?

North and South Dakota (N.D. and S.D.). — (66) These two states were formerly the *territory* of Dakota. What reason can you see for making two states out of the one territory? (67) How do the industries of the two states compare with those of Nebraska and Kansas? (68) Look at the corn and wheat maps (Figs. 209 and 211) to see where most wheat and corn are produced. Is North Dakota more or less important than Kansas as a corn-producing state? Answer the same for wheat. Tell why this is so. (69) Of what advantage would it be to Fargo if a deep river extended from that city to Duluth? (70) What do the Black Hills contribute to the wealth of South Dakota?

General. — (71) Which state is the largest in this group? (Appendix, p. iii.) Which smallest? Compare each of these with Mass., R.I., N.Y., N.C., and Tex. (72) Which of the Central States has the most inhabitants? (Appendix, p. iii.) Which the fewest? Compare each of these with Mass., R.I., N.Y., N.C., and Tex. (73) Find the ten largest cities. (Appendix, pp. iv–vi.) How does their population compare with that of the ten largest in the other groups of states?

Suggestions. — (1) Write a brief description of the Western prairies. (2) Find how much earlier in the fall frosts come in Minneapolis than in Memphis. (3) Mention several advantages of farm life over city life. (4) How do farms that you have seen differ from the Ohio farm described in the text? (5) Find other uses of corn besides those mentioned. (6) How does the wind often help ranch cattle to obtain food in winter? (7) What are some of the adventures that cowboys experience? (8) Why are coal and brick especially valuable in a prairie country? (9) Examine a brickyard, and write a description of brick making. (10) See how long a list you can make of articles manufactured partly or wholly out of copper. (11) Do the same in regard to lead. (12) How are the advantages of the location of Chicago somewhat similar to those of Atlanta? (13) Make a drawing of the great water route from Duluth to New York City, and put in the leading cities. What states border on this route? (14) Make a drawing of the Mississippi, Missouri, and Ohio rivers, and include the leading cities. What states do these rivers border or pass through? (15) State clearly the advantages of these waterways. (16) Make a sketch map of the Central States, including the principal lakes, rivers, and cities.

For References, see *Teacher's Book*.

Fig. 130.

Compare the relief in this section with that of Figures 46, 63, 86, and 103.

WESTERN STATES
NORTHERN SECTION
Scale of Miles
0 50 100 200 300
Capitals of States ⊙ Other Cities •
L.L. POATES ENGR'G CO., N.Y.
Longitude West from Greenwich
DOMINION OF CANADA
PACIFIC OCEAN
WASHINGTON
OREGON
IDAHO
MONTANA
WYOMING
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
COLORADO
UTAH
NEVADA
CALIFORNIA
Edmonton
Battleford
Calgary
Regina
Moose Jaw
Lethbridge
Kamloops
Vancouver
New Westminster
Victoria
Nanaimo
Rossland
Nelson
Kalispell
Ft. Assiniboine
Glasgow
Great Falls
Glendive
Missoula
Helena
Butte
Miles City
White Sulphur Springs
Billings
Bozeman
Anaconda
Seattle
Tacoma
Olympia
Spokane
Wallace
Moscow
Lewiston
Walla Walla
Pendleton
The Dalles
Portland
Astoria
Salem
Albany
Eugene
Roseburg
Ashland
La Grande
Baker City
Salmon
Weiser
Boise
Idaho Falls
Hailey
Pocatello
Montpelier
Preston
Logan
Ogden
Evanston
Rock Springs
Rawlins
Laramie
Cheyenne
Casper
Buffalo
Newcastle
Fremont Pk. 13,790
Great Salt Lake
Salt Lake City
Provo City
Springville
Greeley
Boulder
Denver
Mt. Rainier 14,526
Mt. Hood 11,225
Shoshone Falls
Malheur L.
Klamath L.
Crater L.
Warners Lakes
Yellowstone L.
YELLOWSTONE NATIONAL PARK
Uinta Mts.
Utah L.
Columbia R.
Snake R.
Missouri R.
Yellowstone R.
Platte R.
Powder R.
Big Horn R.
Little Missouri R.
Black Hills
Cascade Mts.
Coast Ranges
Blue Mountains
Bitter Root Mts.
Sweet Grass Hills
Flathead L.
Shuswap L.
Columbia L.
Kootenay R.
Milk R.
Frazer River
N. Saskatchewan R.
S. Saskatchewan R.
Sea of Georgia
Strait of Juan de Fuca
C. Flattery
C. Disappointment
C. Blanco
Gray's Harbor
Port Townsend
Puget Sound
Olympic Mts.
Willamette R.
Deschutes R.
Owyhee R.
Snake R.
Clearwater R.
Lewis Fk.
Rend Oreille R.
Kootenay R.
Columbia R.
Fraser River
Shuswap L.
Yellowstone R.
Big Horn R.
Powder R.
Little Missouri R.
Platte R.
Cheyenne R.
Black Hills
Uinta Mts.
Utah L.
Great Salt Lake Desert
Fremont Pk. 13,790
Mt. Rainier 14,526
Mt. Hood 11,225
Longitude West from Greenwich
120°
115°
110°
105°
50°
45°
40°

FIG. 131.

MAP QUESTIONS. — (1) Compare this group with each of the other sections in regard to relief (Fig. 45); in size and population (Appendix, p. iii). (2) Which is the largest state? The smallest? How does each compare in size with Massachusetts, Pennsylvania, and Texas? (3) What becomes of the water of the Humboldt River? (4) Name the five largest rivers; where does each rise, through what states does it pass, and where does it empty? (5) Name the principal mountain ranges; the plateaus (Fig. 43). (6) Which is the highest mountain peak? (Appendix, p. ix.) (7) Where are the largest cities? Why there? (8) Find the Yosemite and Yellowstone parks. Why is it a good idea for the government to set aside interesting places as national parks? (9) Name the states having a seacoast. (10) Name those draining mainly or entirely into the Pacific; into the Atlantic; into the Great Basin.

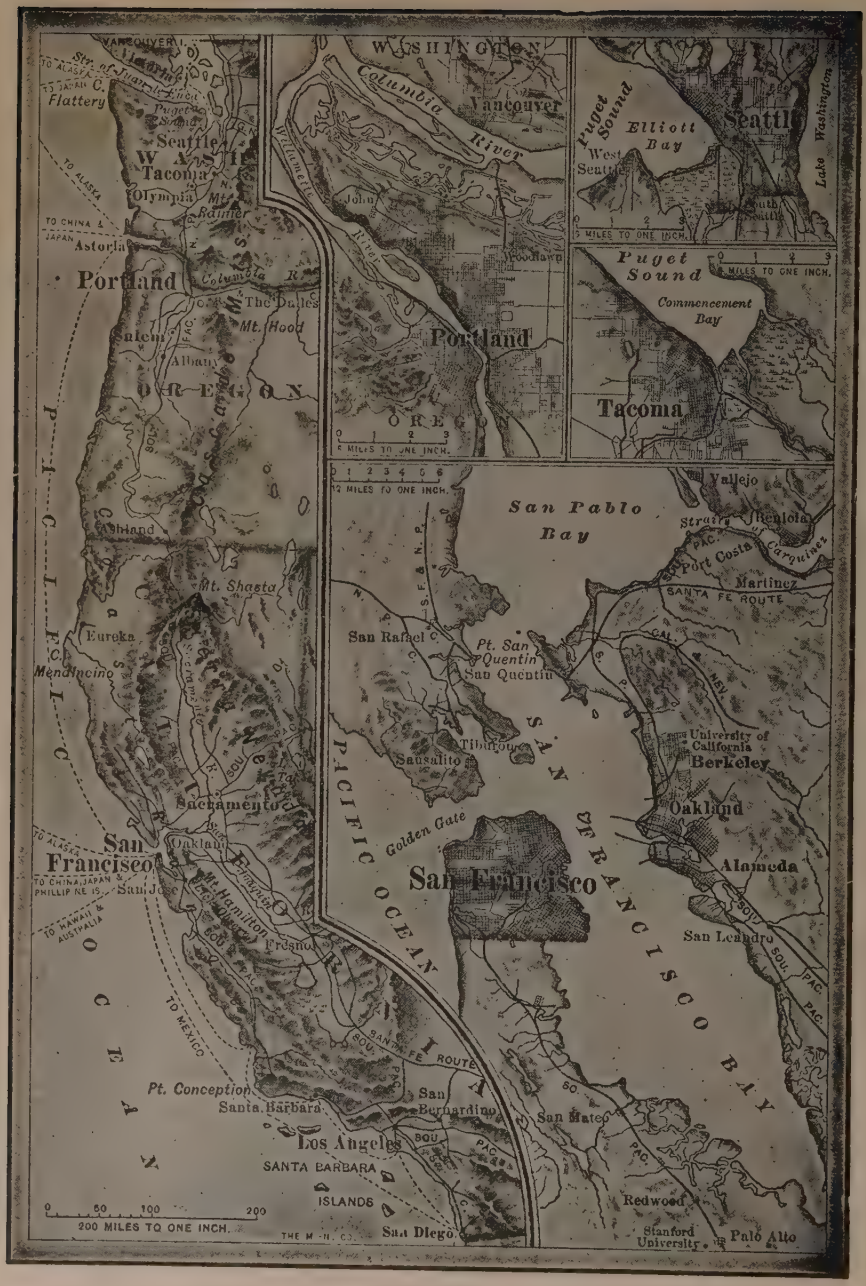


FIG. 132.

Map to show the location of San Francisco, Portland, Tacoma, and Seattle.

IX. THE WESTERN STATES

Early Settlements. — While the pioneers were settling the prairies of the Central States, almost nothing was known about the Far West. The Spanish had taken possession of the southern portion, and many of their names are still retained, as New Mexico, Los Angeles, and San Francisco. In 1848 gold was discovered in the

FIG. 133.

Santa Barbara Mission, Southern California. Still used as a place of worship.

stream gravels of California, and hundreds of thousands of persons left farms, factories, and homes in a mad rush for the gold fields. Some sailed all the way around South America; others crossed the Isthmus of Panama; but many traveled overland, running the risk of attack from Indians and of death from thirst. There were then no railways west of the Mississippi, and the journey was long and tedious.

For ages the rocks of the Sierra Nevada Mountains had been crumbling and washing away, but the gold which they contained lodged in the hollows and crevices of the rocky beds of the streams.

It was this gold that the early gold hunters, or *prospectors*, were seeking, and they obtained it in a very simple manner. Placing some of the stream gravel in a pan of water, they rocked it back and forth in

FIG. 134.

A railway winding about as it crosses the Rocky Mountains.

such a way as to cause the heavier particles of gold to separate from the gravel, while the lighter minerals were washed away. The prospectors were sometimes rewarded by finding large lumps of gold, called *nuggets*, worth hundreds and even thousands of dollars.

The discovery of gold quickly drew so many persons to California that the territory was able to enter the Union as a state in 1850; and, as the search for the precious metal was carried farther and farther, the West soon became explored and settled. Railways were built across the mountains (Fig. 134), and many industries, such as farming, lumbering, and ranching, have followed mining. Indeed, in many sections these industries are now much more important than even gold and silver mining.

Physiography. — The Western States are made up largely of plateaus and mountains. The greater part of the surface is more than a mile above sea level, while some mountain peaks are two and three miles in height.

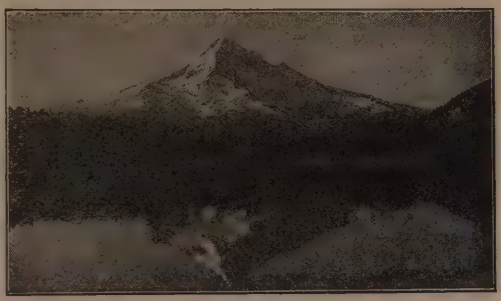


Fig. 135.
Mt. Hood, Oregon.

The extreme eastern portion is a continuation of the Great Plains (p. 126), which reach to the very base of the Rocky Mountains. These mountains extend entirely across the country into Mexico on the south and Canada on the north. They are made up of a large number of ranges and ridges, which attain their greatest height in Colorado. A long distance farther west, and almost parallel with the Rockies, is another system of mountains, called the Sierra Nevada Mountains in California and the Cascade Ranges in Oregon and Washington. Still farther west, and close to the coast, is a third series, known as the Coast Ranges, which in places rise directly out of the ocean.

Fig. J.
Mt. Rainier, Washington

Just west of the Rocky Mountains is a plateau, dotted with numerous mountain peaks and small ridges. It is higher at the two ends than in the middle, and may be divided into three parts (Fig. 43): (1) the great Columbia plateau of Idaho, Oregon, and Washington on the north; (2) the Colorado plateau of Arizona and Utah on the south; and (3) the Great Basin of Utah and Nevada between

the two. The numerous short north and south mountain ranges in the Great Basin are called the Basin Ranges.

Between the Sierra Nevada-Cascade system and the Coast Ranges there is an area of lowland (Fig. 43). In California and Oregon this forms fertile valleys; in Washington it is occupied by Puget Sound.

Throughout most of this Western country evidences of volcanic action abound (p. 5). Some of the loftiest peaks are extinct volcanoes, as Mt. Rainier (Fig. J), within sight of TACOMA, Washington; Mt. Hood (Fig. 135), not far from PORTLAND, Oregon; and Mt. Shasta (Fig. 6), in northern California.

The influence of lava on the West is marked. For hundreds of thousands of square miles it forms the rock of the country, and its decay has produced a soil which is very fertile. It covers the plateaus, especially in the north, and is one of the chief causes of the peculiar scenery of the West.

Climate. — Unlike the East, where the climate is very uniform over large sections, the West is a region of contrasts, with a great variety of climate from place to place. The most general fact about the climate of this vast Western region is its aridity. Large areas of country are so dry that no agriculture is possible without irrigation. Only among the high plateaus and mountains, and in Washington, western Oregon, and the greater part of California, is there rainfall enough for forests or for farming. Thus, almost one fifth of the entire continent is a partial or complete desert.

Along the northwestern coast the damp west winds bring so much vapor that the rainfall is heavy. Indeed, near the coast of Washington there is a rainfall greater than in any other part of the United States, the heaviest rain coming in winter. But being robbed of its vapor in crossing the mountains, the air descends on the eastern side so dry that agriculture is possible in only a few sections, as in the high mountain valleys and in the wheat district of central and eastern Washington and Oregon.

Parts of Nevada, Utah, Arizona, and California are true deserts, and portions of each of the other states approach it. Near the northern shores of Great Salt Lake, for example, not a tree nor even a shrub is to be seen for many miles. The entire surface is covered by a glistening whitish substance called *alkali*. In other regions dreary wastes extend hundreds of miles, interrupted only by cacti and other arid land plants, by rocky ledges, and by occasional mountain peaks.

The lack of water is shown on the map by the scarcity of streams in and near Nevada. That section is a real basin, having a rim

which prevents the water from flowing out, and is called the *Great Basin* (Fig. 43). Its few streams either flow into shallow salt lakes, which are growing more and more salt as the years pass, or they dry up and disappear in the sand.

That much rain falls on the cool mountains and plateaus of the West is shown by the numerous large rivers which have their sources there. Name and locate those flowing from the Rocky Mountains into the Mississippi. Trace the Rio Grande and the rivers that empty into the Pacific Ocean. Although long, these rivers are not navigable, partly because of the steep slopes, and partly because of the lack of water. Indeed, during the dry summer season, many, like the Rio Grande, almost disappear in the middle part of their course.

The importance of even the higher plateaus in condensing the vapor is well illustrated by the highlands of Central Arizona. A person traveling eastward from Los Angeles, on the Atchison, Topeka and Santa Fé Railway, upon reaching the Colorado River in the evening, finds himself in the midst of a desert about 500 feet above sea level. If it is summer, the thermometer may register from 110° to 120° in the shade, for this is the

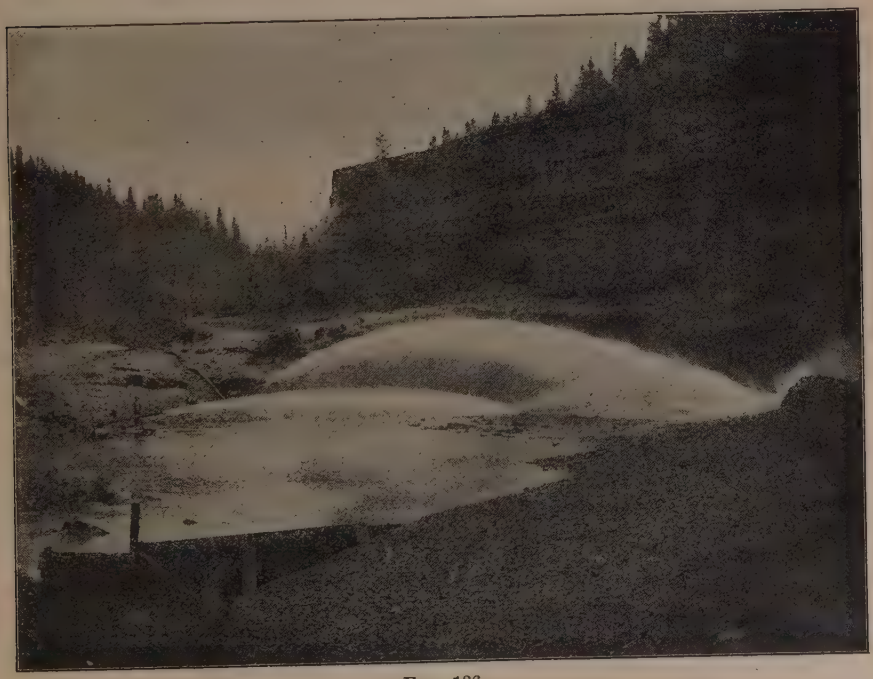


FIG. 136.

Hydraulic mining, Siskiyou County, California

hottest region in the United States, hotter than many parts of the torrid zone. After leaving the river, the train ascends the Colorado plateau, 7000 feet high, and the next morning the traveler is in the midst of a forest, while the almost unbearable heat of the previous day is replaced by a delightfully cool air. As if by magic the scene is changed, simply because, on the elevated plateau, the air is cooler and the vapor can therefore be condensed into rain.

Mineral Products. — As we have already seen, mining was the first industry to attract large numbers of pioneers to the Far West. Every one of the Western States contains mineral deposits of some

FIG. 137.

Mine and mill, Goldfield, Nevada.

kind, as gold, silver, copper, lead, mercury, and coal. This region is now the most important mining district in the world.

Much of the land is still owned by the government, and all ore that is discovered upon it belongs to the finder. Any citizen of the United States may become the owner of a valuable mine, if he can find one on government land. Consequently, hundreds of prospectors are digging into the earth wherever there are indications of ore. In most cases they are doomed to disappointment, but they keep trying, moving from place to place. Sometimes, however, valuable ore is found, and then the poor prospectors become suddenly rich.

Much gold has been discovered in the gravels of stream beds where water no longer flows. In many places these dry beds are near the surface, so that mining is easy; in others, they have been

covered up with a thick blanket of hard lava, beneath which the miners are obliged to tunnel in order to follow them.

Very early the miners became dissatisfied with the slow "panning" of the gold, as washing the gravel in pans was called (p. 148). They then adopted the far more speedy plan of *hydraulic mining* (Fig. 136).

This method of mining within the basin of all navigable streams of the state is now prohibited by law because the gravel and silt were washed into the rivers and made them too shallow for navigation, and during high water caused the rivers to leave their banks and overflow thousands of acres of land.

Another method of mining gold, and the one by which most of that metal is now obtained, is to dig into the solid rock. The shafts and tunnels follow the veins from which the gold in the gravels originally came. The metal is found in rock mixed with other minerals which are of little or no value; but the gold sometimes occurs in such small grains that one may spend days in a mine without *seeing* any.

To secure the gold, the ore is put through a stamp mill (Fig. 138). The ore is dumped into a rock breaker, where it is broken into bits about the size of hens' eggs, dropping into bins to which are attached self-feeders which feed the ore to the batteries containing the heavy stamps.

An abundance of water and a certain amount of quicksilver is put into the batteries with the ore. The ore is ground to fine powder and thoroughly mixed with the water and quicksilver and passed through a fine screen on to amalgamated plates over which it passes, and finally through the concentrates to collect the fine gold. At certain times the stamps are stopped and a "clean up" is made.

One of the most remarkable mining districts in the world was that of the Comstock Lode at Virginia City, Nevada. So many people moved there then that Nevada territory became a state in 1864; and Virginia City, though in the midst of the desert, grew to be a thriving city.

Partly because of the difficulty of mining, and partly because of the failure to discover new bonanzas, some of the mines were abandoned and people drifted away, so that the population of Nevada decreased, but with the discovery of new mining fields, new towns have sprung up, and Nevada is again the center of great activity, with a rapidly increasing population. Tonopah, Goldfield, Rawhide, and Bullfrog are important new mining towns.

At the present time Colorado produces more gold and silver than any other state (Figs. 225 and 226), and much copper, lead, iron, and coal, besides. Among the mountains, one sees mines almost everywhere; one of the most noted mining districts is near LEADVILLE, a city at an elevation of over 10,000 feet above

FIG. 138.

Forty Stamp Mill, Nevada County, California.

sea level. Another well-known mining camp in Colorado is CRIPPLE CREEK. A few years ago no town existed there, and the ore, which has now become so valuable, was not recognized as ore by the prospectors.

After the ore is taken from the mines it must be crushed, the worthless parts must be washed out, and the remainder sent to the *smelters*, where the metal is obtained by a complicated process.

The western half of Montana is another great mining section. HELENA has been a noted mining center, but no portion of the state is now so important for mining as BUTTE. There the principal metal is copper, although some gold and silver are mixed

with the ore. More copper is produced at Butte than in any other mining district in the world. The mines are very extensive, reaching several thousand feet into the earth and having miles of tunnels, through which one might wander for days without finding his way out.

Much of the ore is crushed and reduced in smelters within the city limits. In the process, fumes of sulphur pour forth from the tall chimneys and settle to the ground, killing almost all vegetation, and causing the city and its immediate surroundings to present a barren, desolate appearance.

As in Colorado and Montana, the principal industry in Arizona is mining, much copper, silver, lead, and gold being produced. One of the largest cities in the territory is TUCSON, which, together with the others, is mainly engaged in business connected with mining. There is also much mining, especially of gold, silver, and copper, in each of the other Western States, especially in Idaho, Utah, and New Mexico.

Iron is found in several of the states, but it is not mined to any extent except west of PUEBLO, in Colorado. Coal, usually of poor quality, also occurs in many sections; but a very good grade of coal is produced in Colorado, Wyoming, and in the state of Washington.

Lumbering. — The mining industry requires vast quantities of lumber for timbering. The Butte mines alone consume millions of feet per year. In the mines heavy timbers are placed upright and close together on each side of a tunnel, with crosspieces overhead, to prevent the rock from caving in. Because of the great pressure upon them, timbers more than a foot in diameter are often broken.

FIG 139.

Chopping down a tree in Humboldt County, California.

While a great portion of the country is arid, the mountains and some of the higher plateaus are forested. Thus the mines, which are usually

among the high mountains, are generally supplied without difficulty, for the logs are easily brought to them.

In the damp, equable climate near the northwestern coast, are forests of giant redwood, fir, cedar, and spruce trees which grow to a greater size than any other trees in the world (Fig. 140). While

FIG. 140.

Great logs being removed from the forest in Humboldt County, California. A donkey engine is used to draw the logs to the railway.

the logs in Maine and Michigan are rarely more than two or three feet in diameter, many in Washington and Oregon are from six to ten feet through, and some in California are very much larger.

A visit to a lumbering camp near Tacoma will show that, owing to the size of the trees, and to the climate, the work is carried on very differently from lumbering in Maine (p. 51). The men are able to work both winter and summer. Some trees tower upward for two hundred feet, — that is higher than most church steeples, — and contain as much as fifteen thousand feet of lumber, or enough, when sawed into boards, to build a small house.

After the branches are removed, the tree is sawed into logs of different lengths, as twenty-four, thirty-two, forty-eight feet, and these are dragged to the foot of the mountain, several miles away. There they are piled upon flat cars and taken to the mills (Fig. 143), a single section sometimes

occupying an entire car. Many go to TACOMA and SEATTLE, where there are enormous sawmills. Since there is so much lumber, many of the streets of Tacoma, and other places in this region, are paved with thick planks instead of stone or asphalt.

Agriculture. — Farming is carried on extensively in the well-watered section of the Northwest (Fig. 141). This is a wheat-producing country like the Red River valley. Barley is another common grain and much hay is also raised. During harvest season the air is so dry that both hay and grain may be left out for weeks with little danger of being spoiled by rain.

Great quantities of fruit are also raised in this region. In the north apples, pears, and peaches are produced; but in the south, throughout the whole length of the great valley of California, in

FIG. 141.

Harvesting wheat in the great wheat fields of California, Oregon, and Washington. By this machine, drawn by many mules, the wheat is cut and the seed removed at the same time.

addition to the hardier fruits, are groves of oranges, lemons, olives, and figs, as well as other trees which grow only in warm climates. Stockton and Sacramento are the leading cities of the great valley.

Farming is possible in some other parts of the West by means of irrigation. The influence of irrigation is well illustrated in the region near DENVER, which is crossed by the South Fork of the Platte River, from which a ditch as large as a canal is led out upon the plain.

Smaller branches are led off from the main ditch, and each of these is divided and subdivided to supply farms along its course.

FIG. 142.

Sweetwater Dam near San Diego, California.

When a field needs water, the ditch is tapped and the field flooded, or else the water is led into little furrows a few feet apart. The method of irrigation depends upon the kind of crop that is under cultivation. As there is danger that the supply of water may not last

FIG. 143.

Train load of logs at Sawmill.

through the summer, reservoirs (Fig. 142) are built to store the water furnished by the spring freshets; and when needed, this is allowed to flow into the ditch.

Of course such an arrangement is expensive, and each farmer must pay for his water at a certain rate, as each house in a city pays for its water or gas.

Irrigation has had a great influence on the settlement of the West. Without it DENVER and PUEBLO would not be the cities they are; and, because of the difficulty of obtaining food, scores of mining towns would not be in existence.

FIG. 144.

Oranges and blossoms, near Los Angeles.

Wherever the waters of the rivers are led out over the fields, people form settlements and often small cities. That is the case at GREELEY, in Colorado, CHEYENNE and LARAMIE, the principal cities in Wyoming, and numerous other places.

The Mormons, a religious sect, under the leadership of Brigham Young, migrated into the then unknown West and settled a few miles from Great Salt Lake. There they commenced to build SALT LAKE CITY, which is now one of the most beautiful cities in the country. They also began to raise crops by irrigation, to plant fruit trees, and to convert portions of the desert waste into beautiful gardens.

There are now many "gentiles," as those among them who do not accept Mormonism are called; and agriculture is no longer the sole industry, for many rich mines, especially of gold, silver, and copper, have been opened. There are numerous busy towns and cities, the largest, aside from the capital, SALT LAKE CITY, being OGDEN, which lies north of the capital.

California is a third section noted for its extensive irrigation. The rain comes off the Pacific Ocean during the winter and upon the lofty mountains deep snow gathers. Water for irrigation during the long dry summers is supplied by reservoirs and the melting of the snow. Although a small part of the state is by nature a desert, the addition of water to the fertile soil has changed the country so

Fig. 145.

Raisins drying between the rows of grape vines in a California vineyard.

irrigated to one of the garden spots of the world. This region produces oranges, lemons, prunes, peaches, pears, grapes, figs, olives, walnuts, almonds, barley, wheat, beans, sugar beets, alfalfa, and many other kinds of fruits, vegetables, and grains.

Among the fruits the most common is the orange, especially the seedless navel orange. In the valleys of southern California nearly every home has its orange trees (Fig. 144), and in many cases is entirely surrounded by groves of them. The winter season is the harvest time for oranges, which begin to be picked from the trees about the last of November and continue to be gathered until March or later. They are cut from the trees, sorted according to size, then packed in boxes and shipped away.

Besides fruit in the fresh state, immense quantities of fruit, such as peaches, prunes, apricots, grapes (Fig. 145), and figs, are dried, usually by exposure to the sun. In the Eastern States fruit would decay if left out of doors; but in the sunny climate of the arid lands it dries quickly. Great quantities of fruit are also canned, as near Baltimore and elsewhere in the East.

The beet-sugar industry is carried on extensively in California. Thousands of acres are planted annually to beets which are converted into sugar by the beet-sugar factories located at Spreckels (Fig. 146), Oxnard, Hamilton, Chino, Alvarado, Betteravia, Los Alamitos, Watsonville, Visalia, and Corcoran.

Thousands of persons from the East were originally attracted to California by the mild and healthful climate; but seeing the opportunity for fruit raising, they started orchards. In the valleys which are too cool for raising oranges and other sub-tropical fruits, thousands of acres are devoted to prunes, apricots, grapes,

FIG. 146.

Spreckels beet-sugar factory. 2700 tons daily.

pears, and apples. Land that a few years ago was almost a desert, and worth at best only a few dollars an acre, now supports flourishing groves of fruit.

So important is irrigation that it is being introduced wherever possible ; and every year new irrigation systems are being built, some of them at great expense. One of the future problems of the West is how to store the water of the melting snows until needed by the summer crops.

Ranching. — The manner in which a cattle ranch in Dakota is conducted was described on page 129, and much the same plan is followed for cattle and horses in the Western States. Sheep ranching is conducted somewhat differently, as may be seen from the ranches about BILLINGS, Montana. A good-sized ranch has from twenty-five thousand to forty thousand head of sheep, which, like cattle, may be fed partly upon the government land, or the "range," and partly on land

fenced in and owned by the ranchman. During the coldest winter weather the sheep are in many cases driven into protected *corrals* and fed on alfalfa because the snow on the range sometimes becomes so deep that they cannot obtain food.

FIG. 147.

A sheep herder, and his flock of sheep.

When the sheep are feeding on the range one man with a dog (Fig. 147) can herd twenty-five hundred; and, with a horse in addition, he sometimes takes care of five thousand. Selecting some spot

FIG. 148.

U. S. Battleship *Oregon*. Built by the Union Iron Works.

near water for a camp, the herder drives his sheep out each morning and back at night, going each day a distance of a mile or two from camp. When the grass is eaten in one place, the camp is moved; then, from another point as a center, they wander out as before.

After the winter is over, the first returns to the ranchman come from the sale of the pelts of sheep which have died during the cold weather. He expects a loss of about five per cent a year from this cause.

The real harvest comes from the wool. Men who make it their business to shear sheep travel in squads of about twenty-five. They erect sheds and pens near some sheep center, such as Billings, and shear all the sheep that are brought to them (Fig. 101). Sometimes sheep are sheared at the ranch; but many consider it more desirable to drive them near to a market, thus saving the expense of drawing the wool a long distance to the railway station. In this way the sheep also secure food on the range while on the journey to and from the market.

In the Southwestern States sheep are often sheared twice a year; but farther north it is done only once, and then as near the month of June as possible. Can you suggest a reason for choosing that time? After the wool is cut, it is pressed into bales and shipped to various markets in the East. Where should you think it might be sent, and for what purpose used?

From July on, many sheep are sold for mutton. Those that are from three to five years old, and that have already borne a quantity of wool, are usually selected for this purpose. The hides are useful for leather, the bones for fertilizing the soil, and the tallow for candles.

Territories. — Arizona and New Mexico are still territories, although efforts have been made to unite the two for admission as a single state.

Fig. 149.

Cliff dwellings, built beneath the overhanging cliffs.

This is the region in which some of the most highly developed Indians were discovered by the Spaniards (p. 33). Now most of the country is occupied by Americans who have formed numerous towns and cities, such as TUCSON, PRESCOTT, and PHŒNIX, in Arizona, and ALBUQUERQUE in New Mexico.

The Pueblo Indians still live after the manner of their ancestors. Their homes are built of sun-dried clay, or *adobe*, and in some cases are entered from the roof by means of a ladder (Fig. 28). Other Indian houses, the *cliff dwellings* (Fig. 149), were built on the sides of cliffs beneath overhanging ledges; and still others, *cave dwellings*, were in caves.

Among the early Spanish settlements is the quaint city of SANTA FÉ, the capital of New Mexico. There, as elsewhere in the territory, the houses are mostly low, one-story, adobe buildings (Fig. 150). Spanish is the language most commonly heard, and on all hands one sees the primitive customs of a century ago. For instance, wheat, instead of being threshed out by machines, is often spread upon the ground in an inclosure and trampled by goats until the grain is separated from the hull. The grain is then tossed into the air in order that the wind may carry away the chaff. However, in many parts of New Mexico and Arizona, agriculture, mining, and other industries are well developed, and the leading cities and towns are enterprising and prosperous American communities.

FIG. 150.

A view in a New Mexico town, showing the low adobe houses in which the Mexicans live.

SCENERY

In many places among the mountains there are sights comparing favorably with those of the Alps, which attract so many Americans abroad. Fine views, strangely formed cliffs, deep canyons, and imposing waterfalls are present without number. But among all the interesting places there are three that easily surpass the others in magnificence and grandeur. These are the Yellowstone National Park, the Colorado Canyon, and the Yosemite Valley.

The Yellowstone Park.—This region, chiefly in Wyoming, is a tract of land, larger than Connecticut, which the government has set aside as a national park. It is often called the "Wonderland of America." Among the many objects of interest are boiling

springs, boiling mud springs of different colors, deep canyons and waterfalls. Some of the springs are on the level of the ground, so that one must be on the constant outlook lest he step into one; others are surrounded by a rim several feet high.

A stage road leads from the Northern Pacific Railway to the Mammoth Hot Springs on the northern side of the Park. Here and there are *geysers*, from which hot water and steam occasionally burst forth with great violence, sometimes to a height of 100 or 200 feet. "Old Faithful" (Fig. 151), one of the most regular of these, plays at intervals of 65 minutes to a height of 100 to 130 feet.

Fig. 151.

An eruption of "Old Faithful," Yellowstone Park.

Beyond the geyser basins the Yellowstone Lake is reached, a beautiful sheet of water, nestled in the mountains at a height of nearly 8000 feet above the sea. Its waters flow northward, forming the Yellowstone River, a tributary of the Missouri. To many persons, the falls (Fig. K) and canyon of this river are the greatest wonders of the Park. Soon after leaving the lake, the stream narrows and quickens, and the water leaps 109 feet directly downward. A short distance farther on it tumbles 308 feet farther, or almost twice the height of Niagara. It then runs between banks which rise 1000 feet above it.

The canyon is somewhat winding, with numerous bold cliffs jutting far out into the abyss; and from these, wonderful and inspiring views may be obtained. Far below, one sees the silvery stream, too distant to be heard as it dashes along. Across the chasm, a half mile away, dark green pines fringe the cliff; and between the water and these woods are gorgeously colored rock strata, having all tints of the rainbow.

Colorado Canyon. — One portion of the Colorado Canyon, in Arizona (Fig. L), may be reached on the Atchison, Topeka and Santa Fé Railway. The wonderful Yellowstone Canyon, just described, is a pygmy compared with this.

As one first looks out over the canyon he sees nothing but towers, pinnacles, many-colored layers of rock, and apparently bottomless depths. When he finally takes a position from which he can see the

FIG. 152.

Mariposa Big Trees, California

FIG. K.— Grand Canyon and Falls of the Yellowstone.

FIG. L.— The Grand Canyon of the Colorado.

Fig. M. — Nevada Falls, Yosemite Valley.

threadlike stream far below, it seems almost impossible that so little water could have wrought such a mighty work.

The difficult path which leads to the bottom is seven miles long, and the trip down and back is a full day's journey; but without making it, one fails to appreciate fully the marvelous carving, sculpturing, and coloring. At the bottom the scene is entirely changed; and, as one looks upward to see himself shut in by walls which seem to extend to the very heavens, his own littleness and the immensity of the work of Nature are wonderfully impressed upon him.

Yosemite Valley. — In California, on the western slope of the Sierra Nevada Mountains, about 150 miles east of San Francisco, is the famous Yosemite Valley (Figs. A and M). This valley is six miles long and from one half mile to a mile in width. Its almost vertical granite walls rise from 3000 to 5000 feet. From the top of these cliffs the Merced River and its tributaries fall in grand cataracts from 400 to 1500 feet in height.

Some of the most magnificent scenery in the world is found in this small valley.

About thirty miles southward from the Yosemite Valley is the Mariposa grove of Big Trees (Fig. 152), the largest of which is thirty-five feet in diameter, towering three hundred feet high — the giant trees of the world.

The Cities

Cities in the Interior. — Large inland cities in the Western States are very few in number, the greatest being DENVER, the capital of Colorado. This city is located on the site of a small mining camp, but its growth is chiefly due to two facts: (1) the numerous mining towns among the mountains, and (2) the near presence of water, which has made irrigation on a large scale possible (p. 157). The first fact calls for an important trade center somewhere in that region, and the second makes it possible to secure food.

Denver has now become a railway and manufacturing center, where ore is smelted, and machinery, flour, and cloth manufactured. It is also of importance as a health resort, for its altitude of over five thousand feet, and its dry climate, render it especially adapted to persons suffering from lung trouble. COLORADO SPRINGS, south of Denver and near Pike's Peak, is one of the leading health resorts in the country.

Pueblo, a trade and manufacturing center, is situated where the Santa Fé line meets the Denver and Rio Grande Railway. In this city much ore is smelted, and iron goods are manufactured. It is its nearness to coal and iron ore which makes the latter industry possible.

Cities on the Pacific Slope. — The largest city in all these states is San Francisco (Fig. 132), located on a remarkably fine harbor which was formed by the sinking of the coast, as the harbor of New York City was formed. As in that case, too, there are other important cities near at hand — the largest being Oakland. Close to San Francisco are the two most important educational institutions in the Far West, — one, the University of California, at Berkeley (Fig. 125 A), the other, Leland Stanford Junior University (Fig. 125 B), a short distance south of San Francisco. Farther south is San José, and to the northeast are Sacramento, the capital, and Stockton.

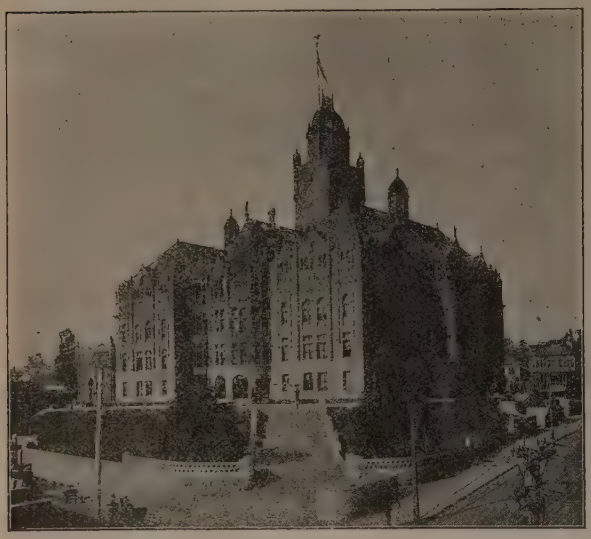


Fig. 153.

The County Court House, Los Angeles, one of the most beautiful buildings in the country.

The enormous crops of wheat, fruit, and wool in northern California suggest some of the occupations in these cities. What are they? Owing partly to an insufficient supply of coal, manufacturing was slow in developing in this region, but now this need is supplied by an abundance of crude petroleum found in central and southern California, and many important industries are springing up. In western Oregon and northern California wood is largely used for fuel. Most of the wool raised in the West is shipped to the East to be manufactured into clothing, blankets, etc., and some of these manufactured articles are sent to California to be sold.

San Francisco has important foundries and machine shops, flour

and woolen mills, sugar refineries, canning factories, breweries, and distilleries. The principal products sent away from the state are gold and silver, wine, fruit, wool, grain, and manufactured goods, some going East by rail and some by water. This is the greatest shipping point on the Pacific coast; and as our trade with the Phil-

FIG. 154.

Chester Place, Los Angeles.

ippines, Hawaiian Islands, and other Pacific countries increases, we may expect San Francisco to grow even more rapidly.

The Union Iron Works of San Francisco built the U. S. Battleship *Oregon* (Fig. 148), which went around "The Horn" and assisted in the destruction of the Spanish Fleet at Santiago de Cuba, the U. S. S. *California*, and in fact all war vessels built for the government on the Pacific coast, with the single exception of the U. S. S. *Nebraska*, which was built by the Moran Shipbuilding Company of Seattle, Washington.

There are few good harbors on the Pacific coast of the United States compared with those of the Atlantic coast.

San Francisco Bay has few equals as a harbor; it could float at one time all the navies of the world.

South of San Francisco are the harbors of Monterey Bay, Santa Barbara Channel, San Pedro, and San Diego Bay. Estimate the distance of these points from San Francisco (Fig. 132).

From the harbor of Humboldt Bay, north of San Francisco, are shipped large quantities of lumber, shingles, and dairy products.

The harbor of Portland, Oregon, is situated on a tributary of the Columbia River, about a hundred miles up the river at the head of deep-water navigation. Most of the other important towns of Oregon are inland, and Portland has grown to be the chief shipping point by water, and therefore the largest city. From this point wheat, wool, and lumber, the leading products of Oregon, are shipped in great quantities. Portland has extensive manufactories of woolen goods, flour, and furniture; and SALEM, the capital, also has large woolen and flour mills.

Farther down the Columbia are several towns, the largest being ASTORIA, where, as elsewhere along the river, the salmon industry is developed. The salmon, like the shad of the East (p. 72), although spending its life in the ocean, passes up the rivers to *spawn*, or lay its eggs, in fresh water. In their passage the fish are caught in great numbers (Figs. 155 and 156).

In Washington, SEATTLE and TACOMA (Fig. 131) are situated on Puget Sound; but SPOKANE, the third city in size, is located

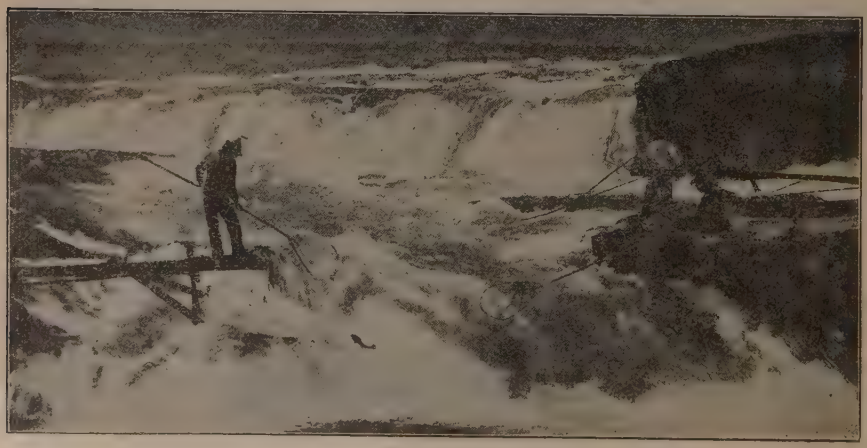


FIG. 155.

Catching salmon in dip nets as they leap over the falls.

near Spokane Falls on the Spokane River in the eastern part of the state. Coal, lumber, grain, and hops are the principal exports. There is also extensive manufacture of flour at Spokane, and of lumber and furniture along the shores of Puget Sound, especially at Seattle and Tacoma. These goods are shipped away in large amounts, some going to the Eastern cities, some to China, Japan, the Philippines, Alaska, and other countries.

FIG. 156.

A wheel, with a net on it, which revolves in the current and lifts the salmon from the water as they swim past.

On Figure 227 notice what great lines of railway cross the continent to the Pacific coast, and in what cities they terminate. What about the number of railways on the Pacific coast compared with those on the Atlantic?

QUESTIONS AND SUGGESTIONS

REVIEW QUESTIONS AND TOPICS. — (1) Tell how California became settled. (2) How did gold get into the streams? (3) How did the prospectors obtain it? (4) Describe the physiography: — the mountains and plateaus; the volcanoes; their effects. (5) Tell about the climate: — the aridity; the rainy Northwest; the deserts; the effect of plateaus and mountains. (6) What minerals are found in the West? (7) Tell about the prospectors. (8) Describe hydraulic mining. (9) What kind of gold mining is now most common? (10) Give the history of the Comstock Lode. (11) What effect did it have upon Nevada? (12) What state now produces most gold and silver? (13) Name and locate the principal mining towns in Colorado. (14) What must be done with the ore? Where is it done? (15) Name and locate the principal mining town in Montana. (16) In Arizona. (17) Where is copper found in these states? (18) Where is coal chiefly found? (19) Where are the forests? Why? (20) Describe lumbering near Tacoma. (21) What are the farm products of the sections that are well supplied with rain? (22) State the plan for irrigating the land near Denver. (23) Tell how irrigation has influenced the settlement of the West. (24) Name some cities that have irrigation systems. (25) Tell about the Mormons. (26) Describe the fruit region of southern California: — the appearance of the country; the climate; the products; what is done with them; the cities; the importance of water. (27) Why is ranching carried on in the West? What animals are raised? (28) Tell about sheep ranching: — number of sheep; care given them; shearing;

uses of the products. (29) Tell about the Indians of New Mexico and Arizona. (30) About the primitive customs of the Mexicans. (31) Describe the Yellowstone Park: — location; size; springs and geysers; the canyon. (32) Describe the Colorado canyon. (33) The Yosemite Park. (34) Name the principal inland cities, telling for what each is important. (35) What cities are on or near San Francisco Bay? For what important? (36) Tell about San Francisco. (37) Name the harbors south of San Francisco. (38) Describe the location and industries of Portland. (39) What is done at Salem? (40) Tell about the salmon industry. (41) Name the cities of Washington. For what is each important?

Review by States: *Montana* (*Mont.*). — (1) What industries are carried on in the eastern part? Why? (2) What industries in the western part? (3) Name the cities mentioned in Montana, and tell for what each is important. (4) What two large rivers drain this section? (5) Through what states do they flow before reaching the Gulf? (6) Draw an outline map of the state; and, as each of the other states is studied, do the same for that.

Wyoming (*Wy.*). — (7) What industries are carried on in this state? (8) What cities are mentioned? In what connection? (9) Find the Yellowstone Park, and tell for what it is noted. (10) On the maps showing principal grain-producing regions (Figs. 209 and 211), Wyoming is a state where very little is produced. Why so little there?

Colorado (*Col. or Colo.*). — (11) Examine Figures 209 to 226 to see what is done in Colorado. (12) Give the reason why there is more water for irrigation in this state than in some of the others. (13) Trace the divide between the Pacific and Atlantic drainage, as it crosses Colorado. Trace it northward to Canada and southward to Mexico. (14) Name the cities in Colorado mentioned in the text, and tell for what each is important. (15) Find the population of Denver. (Appendix, p. v.) Compare it with the largest city in each of the other Western States, and also with New Orleans, Buffalo, and St. Louis.

New Mexico (*N.M.*) — (16) What about the inhabitants? (17) What is said about the industries? (18) Find how large is the largest city. (Appendix, p. iv.) (19) Compare it with the largest city in Massachusetts. In Nevada.

Arizona (*Ariz.*). — (20) Tell about the river that crosses the territory. (21) What city and industries are mentioned? (22) What minerals are obtained here? (23) How does the largest city compare in size with the largest in New Mexico? In Colorado?

Nevada (*Nev.*). — (24) For what was Nevada famous? (25) Find its present population. (Appendix, p. iii.) Why are there so few people?

Utah. — (26) Tell why the Great Salt Lake is salt. (See First Book, p. 55.) (27) What are the industries of this state? (28) What cities are mentioned? Tell about each. (29) Examine the maps, Figures 209 to 224, to see what products come from Utah.

Idaho (*Ida.*). — (30) What metals are obtained? (See Figs. 224 and 226.) (31) What great river drains Idaho? (32) What mountain range forms the eastern boundary?

Washington (*Wash.*). — (33) Compare the coast line with that of Oregon; of Maine. (34) Tell about the rainfall of this state. Compare it with Montana (page 150). Why this difference? (35) What effect has the rainfall upon the industries? What are the principal industries? (36) What cities are mentioned in the text? Tell about each.

Oregon (*Ore.*). — (37) What advantage do you see in the location of the largest city? (38) Compare it in size with Denver, New York, Boston, and New

Orleans. (39) Examine the maps (Figs. 209 to 224) to see what is produced in Oregon. (40) What industries are mentioned in the text? (41) What cities are mentioned and in what connection?

California (*Cal.*). — (42) What about the rainfall? (43) What rivers drain most of this state? (44) Describe the relief. (45) Name the cities mentioned; for what is each important? (46) What industries in the state? (47) What advantage do you see in the location of San Francisco? (48) Compare its population with that of Boston, New Orleans, Denver, and Chicago. (49) What caused the early growth of California? What effect has that had on the other Western States? (50) To whom did California belong before we obtained it?

General. — (51) Which state has the largest population? (See Appendix, p. iii.) The smallest? (52) Compare each with Massachusetts, Rhode Island, New York, and South Carolina. (53) Name the ten largest cities. (Appendix, pp. iv–vii.) Add their populations together, and compare the result with the ten largest in each of the other groups. (54) Which group of states has the most large cities? Which the least? What reasons can you give?

Suggestions. — (1) Read about the expedition of Lewis and Clark from St. Louis to the Pacific coast in 1803–1806. (2) What is the origin of the expression "to pan out"? (3) Why do the heavier rains on the northern Pacific coast come in winter? (4) Mention several of the advantages and disadvantages of having no rain for several months at a time, as in southern California. (5) Make a collection of minerals for the school. (6) Hydraulic mining has been largely prohibited in many parts of the West. Why? (7) Should the ditch that is to irrigate a certain field skirt its upper or lower edge? Why? (8) Which is the more easily irrigated, nearly level land, or land that is rough and hilly? Why? (9) Is southern California as liable to cold snaps as Florida? Why? (10) Make a list of articles made of wool. (11) Why have Arizona and New Mexico not become states? (12) Find out about the wild animals in Yellowstone National Park. (13) Write a story describing a visit to southern California. (14) Make a drawing of the Western States.

GENERAL REVIEW QUESTIONS FOR THE UNITED STATES

(1) Name the principal crops of the United States, and tell in which section each is raised. (Consult the figures, 209 to 231.) (2) Do the same for mineral products. (3) For other raw products. (4) For manufactured articles. (5) Name the five largest cities in their order. (Appendix, p. iv.) For what is each important? (6) State some ways in which the rainfall influences the occupations of the people. (7) The temperature. (8) State clearly the influence of the sinking of the coast. (9) Of the glacial period. (10) Of the coal period. (11) Of the absence of forests on the prairies. (12) Of the rich mineral deposits in the West. (13) In what ways have the Great Lakes been of value? (14) Name some of the cities that have been benefited by them. (15) In what ways have the Mississippi River and its two largest tributaries been of value? (16) State the natural advantages that have aided the growth of Boston, New York, Buffalo, Philadelphia, Baltimore, New Orleans, Detroit, Chicago, St. Louis, and San Francisco. (17) Can you name some other cities that have also been influenced by their surroundings? (18) Which is the largest state? (Appendix, p. iii.) The second in size? The smallest? The next to the smallest? (19) Which state has the largest population? (Appendix, p. iii.) The second largest? The

smallest? Next to the smallest? (20) Draw a map showing the states on the Atlantic coast. Also make a map of those along the Pacific coast; along the Great Lakes; the Mississippi River; the Ohio; the Missouri. (21) What states border Mexico? Canada?

For REFERENCES, see *Teacher's Book*.

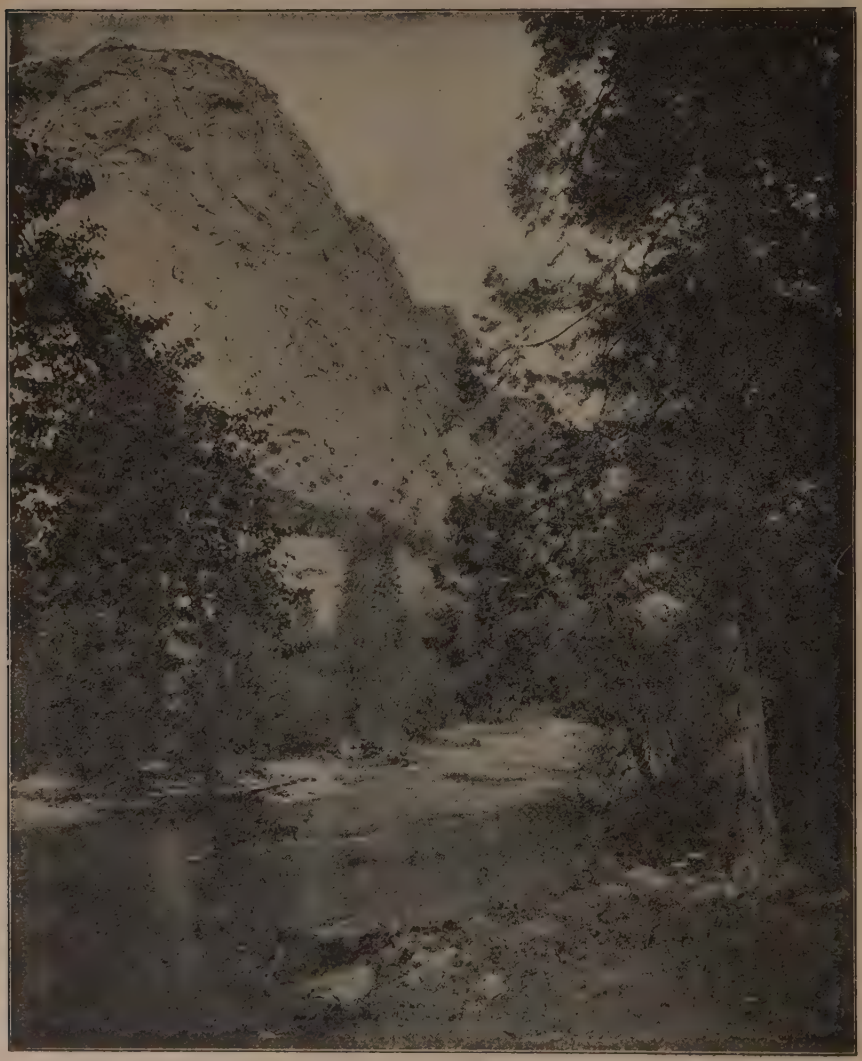


FIG. N.

North Dome, King's River Canyon, California

X. TERRITORIES AND DEPENDENCIES OF THE UNITED STATES

At the close of the Revolutionary War the United States consisted of thirteen small colonies along the Atlantic coast from Maine to Georgia. The United States claimed the land far into the wilderness, even to the distant Mississippi. Beyond this was French and Spanish territory, while the whole Mississippi Valley was occupied by Indians. By purchase and by war we have acquired all the land between the Atlantic and the Pacific which has been described in the previous pages; but our control does not end with the boundaries of the United States proper. In 1867 we acquired Alaska, and in 1898 we came into possession of a number of islands, some of them on the other side of the globe. Since these lands form a part of the territory controlled by our government, a study of them properly comes at this point.

Alaska

Climate and Physiography. — For a long time Alaska, which is more than twice as large as Texas, belonged to Russia. That nation sold the territory to us for $7,200,000; but at the time many people considered it very unwise to pay so large a sum for so distant and desolate a land. However, it has already proved of great value, and has paid for itself many times over.

Since the Arctic Circle extends across the northern part of Alaska, it will be seen that the climate must be very uninviting. The winters are long and cold, and the summers short and cool. A strip of coast land extends southward from the main peninsula of Alaska, and to this the prevailing westerly winds bring an abundance of rain and snow. Since these winds come from the ocean they also render the winter climate much less cold than in the northern part of the territory. In this portion is situated Sitka, the capital, where the governor of the territory lives.

A large part of Alaska is mountainous, for the mountains of the United States and western Canada extend northward into this terri-

tory. Among these mountains are the loftiest peaks of the continent, the highest yet discovered being Mt. McKinley, which is 20,464 feet high. Owing to the latitude, most of the mountains are snow-covered throughout the year (Fig. 158), and among them are innumerable glaciers, many of which reach down to the sea.

One of the largest glaciers now on the continent, known as the *Muir Glacier*, is located in Alaska, not far north of Sitka. It is so wonderful and beautiful that many tourists visit it every year. The long peninsula and the chain of Aleutian Islands which form the southern boundary of Bering Sea are really a growing mountain chain 1600 miles in length. All together there are 57 volcanoes in this chain, and it was here, in 1795, that a new volcano suddenly broke forth, building a lofty cone where previously ships were able to sail.

Fishing. — Among the resources of Alaska, as in the case of other far northern lands, those of the sea are especially important (p. 21). In the shallow waters near the coast both cod and halibut abound, while immense numbers of salmon run up the rivers every summer, as they do in northern United States and Canada (pp. 172 and 195). The fishing industry is only partly developed, chiefly because of the great distance from a profitable market; but the waters of the Alaskan coast form an important fishing reserve for the future.

Whaling. — Every year steamers, especially built for the purpose, venture through Bering Strait into the Arctic Ocean in search of the whale. It is a hazardous occupation, and but few ships are now engaged in it. They are obliged to push their way into the *floe* ice (Fig. 265), in which they are in danger of being imprisoned and held firmly through the winter.

A whale (Fig. 159), which is sometimes over a hundred feet long, is really a land animal which has taken up life in the sea, as seals and walruses have. Therefore, unlike the true fishes, which secure air from the water by means of gills, the whale must now and then rise to the surface for air. It is when rising to breathe, or "blow," that the huge creatures are harpooned.

Sealing. — In the Arctic are found many different kinds of seal. One of these, the *fur seal*, which lives in Bering Sea, is of great value because of its soft fur, which is much used for winter cloaks. During the greater part of the year the fur seals swim in the sea in search of food; but in the spring, during the breeding season, they resort to the Pribilof Islands. The United States government prohibits all persons from killing them except one

FIG. 157.

MAP QUESTIONS. — (1) Find Alaska on Figure 42. What waters surround it? What country bounds it on the east? (2) Locate Sitka, Circle City, Nome City, and Dawson City. (3) Trace the course of the Yukon. (4) Find the Aleutian Islands. What sea north of them? (5) Find the Pribilof Islands. (6) From Figure 10 tell about the relief of Alaska. (7) Locate Mt. St. Elias, Mt. McKinley.

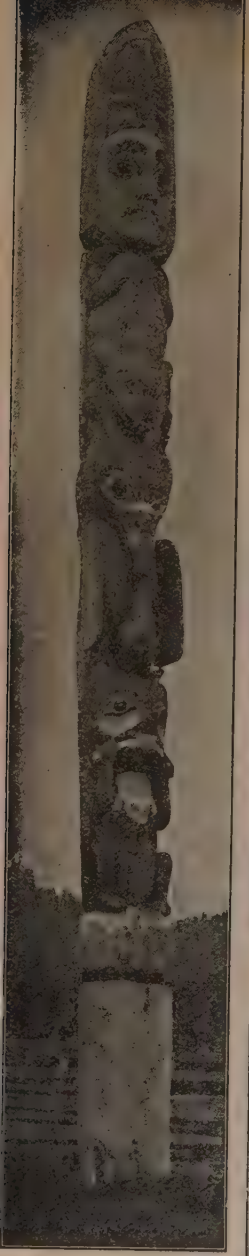


FIG. 0.
Totem Pole, Wrangel, Alaska.

FIG. 158.
S. S. *Spokane* at Muir Glacier, Alaska.

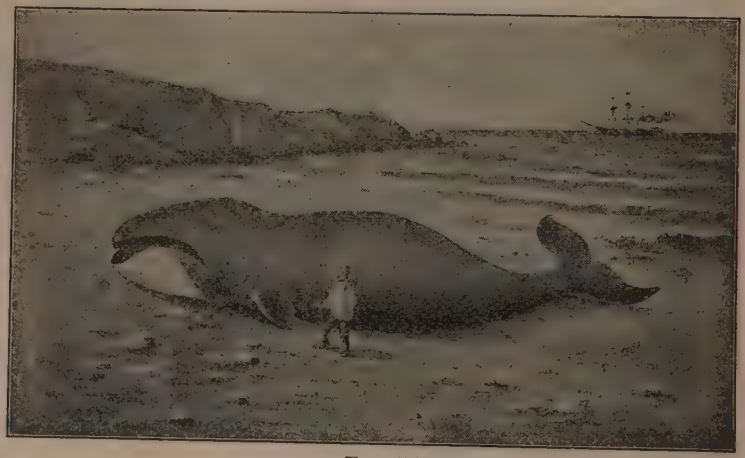


FIG. 159.
A whale ashore, and a whaling steamer lying off in deep water.

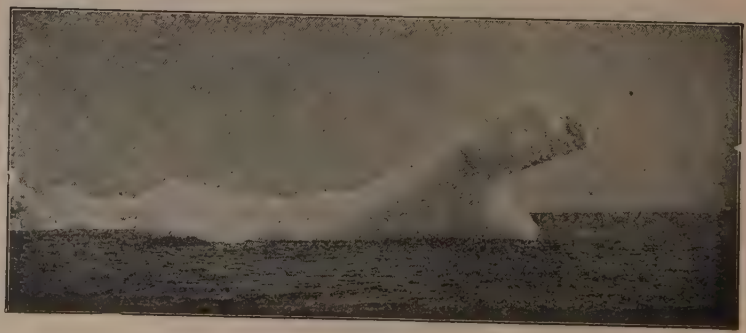


FIG. 160.
Floating iceberg in Glacier Bay, Alaska.

company, which pays a special tax for the privilege of securing a certain number each year. At the proper season the men select a number of males, — for a law forbids the taking of the females, — and drive them off for slaughter, much as sheep would be driven.

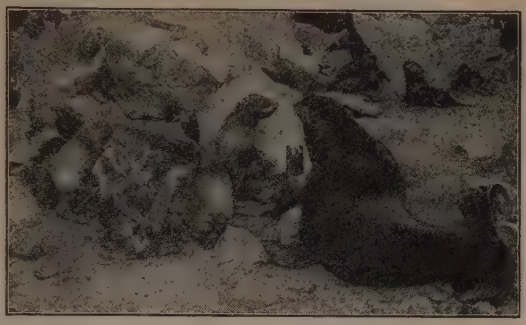


FIG. 161.

Fur seals among the rocks near the coast of one of the Pribilof Islands.

Mining. — While there is some opportunity for farming in southern Alaska, and the great tracts of forest land may be the seat of an important lumbering industry in the future, at present the most noted industry of Alaska is gold mining. There are extensive deposits of gold, copper, coal, and other minerals; but they are so difficult to reach that there has been little development of any of these except the first. A short distance north of Sitka, at JUNEAU, there are some very profitable gold mines; and elsewhere in the territory gold mining is also carried on.

FIG. 162.

Miners fording the icy water of an Alaskan river, on the way to the Klondike. Two of them are harnessed in a wagon containing their supplies.

Recently, Alaska and the neighboring Klondike region, just across the line in Canada, have attracted attention because of the discovery of rich deposits of gold-bearing gravels, somewhat like those found in California in 1848. Although a bleak, desolate region, far in the interior and difficult of access, men have rushed to it, as years ago they hurried to California. Some

have gone overland across the mountain passes (Fig. 162); others have traveled an easier route by water, taking a steamer to the mouth of the Yukon River, one of the longest rivers on the continent. There they transferred to river boats; but since the Yukon is frozen over during most of the year, this journey can be made only in summer.

In the scramble for gold many persons have endured terrible hardships. Most of them have returned with little of the precious metal, but some have brought back fortunes. Good-sized towns have grown up as a result of the inrush of people, the largest being Dawson City, Canada, and Circle City in Alaska, just south of the Arctic Circle. Another city that grew in a single season is Nome City.

Cuba and Porto Rico

While the United States has within recent years secured possession of bleak northern lands, it has still more recently come into control of some warm tropical islands. As a result of the war of 1898, Porto Rico was ceded to the United States, and Cuba was given its independence under the general guidance of the United States.

Physiography and Climate. — Among the West Indies (p. 214) the largest island is Cuba, which is nearly as large as Pennsylvania, although much longer and narrower. The next in size is Haiti, and of the others the only two of much importance are Jamaica and Porto Rico, the latter being three-fourths the area of Connecticut. Cuba, Haiti, and Porto Rico form a portion of a single mountain chain, highest in Haiti, though reaching an elevation of 8600 feet in Cuba.

While there are tree-covered mountain ranges in each of the islands, a large portion of Cuba and Porto Rico has been cleared and cultivated. This is especially true of Porto Rico, which is really an island of farms. Crops grow luxuriantly, partly because of the excellent soil, formed by the decay of the rocks, and partly because of the favorable climate.

The islands are entirely within the tropical zone, so that their temperature throughout the year is high; and on the lowlands neither snow nor frost is known. They receive an abundance of rain, especially upon the northeastern or *windward* slopes, where the damp winds which blow from the northeast first reach the land. The summer is the rainiest season, for then these winds blow with greater strength and steadiness.

FIG. 163.

MAP QUESTIONS. — (1) Find these islands on Figure 42. (2) Which is the largest island? (3) Name three others in order of their size. (4) What island lies south of Cuba? What is its capital? (5) What group of islands lies north of Cuba? To what nation do these islands belong? (6) What other nations own islands in the West Indies? (7) On the map, Figure 42, find the Bermuda Islands. (8) What waters bathe the shores of the West Indies? (9) Find Havana, Santiago de Cuba, Matanzas, Ponce, and San Juan.

FIG. 164 (upper).
Morro Castle, at the entrance to Havana harbor.

FIG. 165 (lower).
A home in Cuba.

Forests and Minerals. — When first settled, the West Indies were covered by a dense tropical forest. Much of this has been cleared away for purposes of farming; but some of the woods still remain, especially among the higher mountains. In Cuba, for instance, there is still much valuable timber, such as mahogany, ebony, and fustic, which produces a valuable yellow dye.

Besides these raw products of the soil, there is much mineral wealth in Cuba. Copper is found there, and also iron, the latter having been mined for a long time in the neighborhood of SANTIAGO.

Agriculture. — However, it is agriculture that forms the chief industry of the Cubans and Porto Ricans. As in all the West Indies, the principal crop is sugar cane (Fig. 204), which grows well in the rich soil and the warm, rainy climate. Although much sugar is raised, the industry has not proved very profitable because of the primitive methods employed and the absence of a good market. Now that the United States has come into closer relation with these islands great improvement should take place.

Sugar production is carried on in Cuba much as it is in Louisiana (p. 104). After the cane is cut, the sap is extracted and reduced to brown sugar in sugar houses, and then sent away to be manufactured into white sugar. Two of the products of the sugar plantations are molasses, and rum, which is made of molasses.

FIG. 166.

A Cuban ox team.

A second important crop is tobacco, for which Cuba is especially noted. There is one district, on the western end of the island, where the rich, limy soil and the climate are peculiarly suited to the growth of the best quality of tobacco. At HAVANA and other places it is manufactured into cigars, which bring high prices — the Havana cigar being considered the best that is made. What has been said about Key West in Florida?

Upon the hill slopes much coffee is produced, and some tea and cocoa. The coffee plant not only requires a good soil, but must be grown in the

shade of trees. Spices, including nutmeg, cinnamon, and ginger, are products of the West Indies, also pepper, cardamom, vanilla, and pimento or allspice. Such fruits as bananas, oranges, limes, pineapples, and cocoanuts are also produced; but, because of the poor market, in small quantities. In the future much more attention will doubtless be paid to fruit raising. Indeed, both Cuba and Porto Rico will probably now become not only winter gardens, supplying fruit and vegetables to the United States, but also important winter resorts.

FIG. 167.

A Cuban boat.

The United States has been able to raise almost all products of the soil that we have required, with the exception of the tropical and semi-tropical crops, such as tea, rice, coffee, sugar, spices, and tropical fruits; and our newly acquired islands are capable of supplying even these.

The Inhabitants. — Portions of Cuba and Porto Rico are densely populated, although in Cuba's war with Spain thousands upon thousands of the inhabitants were killed in battle or starved to death. Property has been destroyed, and the island devastated to such an extent that it will be many years before a full tide of prosperity returns.

Many of the natives are of mixed blood. The aborigines did not prove good slaves to their Spanish conquerors, and negro slaves were brought from Africa. Therefore, while pure-blooded Spaniards are numerous, many of the inhabitants of Cuba and Porto Rico are negroes, either full blooded or half-breeds. The Spanish have kept these natives very poor and densely ignorant; but they are capable of advancement under proper guidance, and this, it is hoped, they will receive from the United States.

Cities. — Owing largely to an entire lack of coal and to the policy of the Spaniards, there has been very little manufacturing; but nevertheless there are several important cities, principally along the coast, at points where there are remarkably fine harbors. The largest of these is HAVANA in Cuba, a city of 235,000 inhabitants, and for a long time the center of the Spanish dominion in America. Another large city in Cuba is SANTIAGO DE CUBA, where the Span-

ish ships were sunk in 1898 (see map, Fig. 163). A third important city, with an excellent harbor, is MATANZAS.

Railway lines connect some of these cities and also reach out into the agricultural districts, thus serving to bring the crops to these ports for shipment. However, many of the towns are not connected by rail; and since there are few good wagon roads, they have almost no communication with the outside world, except by boat.

FIG. 168.
The harbor of Havana.

The conditions in Porto Rico are nearly the same as in Cuba, though it is less wooded than Cuba and more completely cultivated. Along the lower sections, near the coast, sugar and tobacco are raised; the low mountains pro-

FIG. 169.
Flowing lava in Hawaii, 1881.

duce excellent coffee, one of the most important products of the island; and the slopes between these two sections are largely occupied by herds of cattle. As in Cuba, there are a number of coastal cities, the largest being PONCE and SAN JUAN, the capital.

THE HAWAIIAN ISLANDS (Fig. 172)

The Volcanoes. — Far out in the mid-Pacific, not quite a third of the distance from the Pacific coast to the Philippine Islands, is a mountain chain fifteen hundred miles long, most of which lies beneath the ocean. From this long, submarine ridge there rise several volcanic peaks, forming a chain of islands, known as the Sandwich or Hawaiian Islands. The largest is Hawaii, which is nearly as large as Connecticut.

Each of the islands is composed chiefly of lava which has been erupted from within the earth. Two of the large Hawaiian volcanoes are still active, the largest, Mauna Loa, extending nearly fourteen thousand feet above the sea. From the coast the sea bottom descends so rapidly that, within a few miles of the shore, a depth of eighteen thousand feet is found. Therefore, if the water should be removed, a mountain peak would be revealed rising nearly thirty-two thousand feet above its base — a loftier mountain than any known on the land.

FIG. 170.
Executive Building, Honolulu.

Climate. — The latitude of the Hawaiian Islands (Fig. 511) is about the same as that of Cuba and Porto Rico. Being in the midst of the broad Pacific, and therefore surrounded by warm ocean water, the climate near sea level is warm and wonderfully equable. From day to night, and even from summer to

winter, the thermometer varies only a few degrees. As in the West Indies, the northeast winds blow steadily and bring an abundance of rain to the windward northeastern slopes. The opposite or *leeward* slopes are very much drier, and in places even arid.

Industries. — The Hawaiian Islanders are an intelligent race, resembling the natives of other Pacific islands. Since white men brought in new methods of agriculture, the larger islands have become fairly productive, the principal crop being sugar. Coffee, tropical fruits, and rice (Fig. 171) are other products, the last being cultivated by the Chinese, who make up a large part of the foreign population. There are also many Japanese, Portuguese, and Americans. The chief market has been the United States, especially San Francisco. In fact, these islands formed one of the principal sources of food supply for the early California mines.

The white men's interests in the Hawaiian Islands led to a revolution some years ago, by which these men took control of affairs from the native queen, set up an independent government, and offered themselves to the United States as a territory. After some delay this offer was accepted.

While some of the inhabitants are engaged in agriculture, large numbers are gathered in small villages along the seacoast. There are only two cities, HONOLULU on the island of Oahu, and HILO on Hawaii.

FIG. 171.
Planting rice in the Hawaiian Islands.

The Hawaiian Islands as a Coaling Station. — During the war with Spain the Hawaiian Islands were of importance to the United States as a coaling station for ships bound to the Philippine Islands. The distance from San Francisco to the Philippines is somewhat more than seven thousand miles. If we wish to send a warship there from the Pacific coast, it is quite necessary that it should find a place on the way at which it could obtain coal. Such a ship might carry perhaps eight hundred tons of coal; but as it may burn from sixty to seventy tons a day, this would last less than two weeks, while the journey across would require more than three weeks. Therefore the government needs a place where it can store large quantities of coal, perhaps as much as ten or twenty-five thousand tons, to be used in case of need. All large naval powers

need coaling stations in various parts of the ocean. Great Britain, the greatest power upon the sea, has them scattered all over the world.

Guam and Samoa

For a number of years the United States, Germany, and England had control over the Samoan Islands (Fig. 172); but this arrangement did not prove satisfactory, and now Tutuila, one of the islands, is owned by the United States. This tiny island is of little value to us except for the coaling station at the harbor of Pago Pago (Fig. 172). The natives are of the same race as those of the other islands of the open Pacific. They are splendidly developed physically, and manage a boat and swim so well that they are almost as much at home in the water as on land. The principal products are cocoanuts and cotton, and the chief city is Apia, on Upolu, which belongs to Germany.

In consequence of the war with Spain, we obtained the island of *Guam* (Figs. 172 and 511), one of the Ladrones or Robbers' Islands, some distance east of the Philippines. These islands, the loftiest peaks of a submarine mountain chain, were first seen by Magellan, who was later killed by the natives of the Philippines. Guam, the largest of the Ladrones, reaches an elevation of fifteen to eighteen hundred feet above the sea; but it is so small, and so far away, that it also is of little service to us except as a coaling station for vessels.

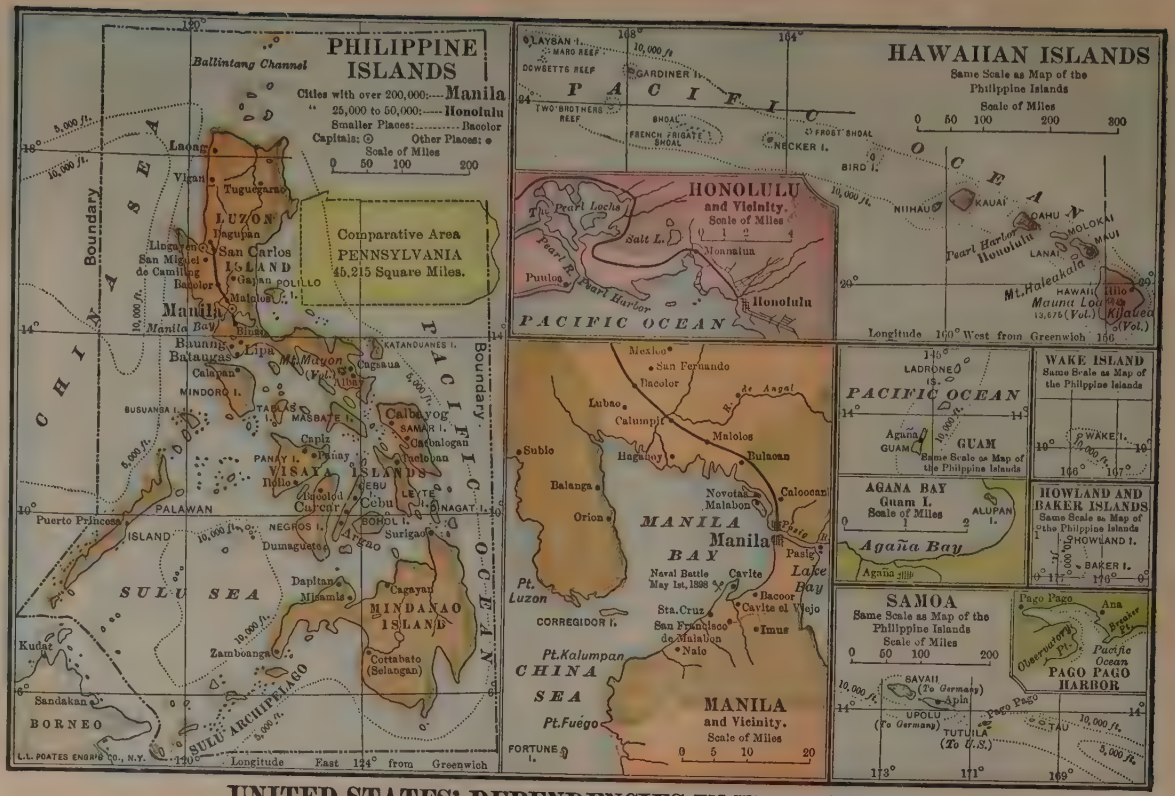
The Philippine Islands

purchased from spain in 1898 for $20,000,000

Physiography. — This group of islands, or *archipelago*, consists of several thousand separate islands, many of which are very small. The largest, Luzon, is about the size of Kentucky, and the second, Mindanao, is almost as large. Like the West Indies and the Hawaiian Islands, the Philippines are portions of mountain chains in the sea. They form part of a still greater chain, reaching northward to the Japanese Islands and beyond.

Throughout the archipelago earthquakes are common and sometimes very destructive to property and to life; for instance, the earthquake of 1863 destroyed a large part of Manila. The earth is in an almost constant state of tremor, though most of the shocks are so slight that they are detected only by the aid of delicate instruments. In addition to earthquakes there have at times been destructive volcanic eruptions. Some of the volcano cones of the Philippines attain a height of 8000 to 10,000 feet.

While parts of the islands are mountainous and still covered by for-



UNITED STATES' DEPENDENCIES IN THE PACIFIC.

FIG. 172.

MAP QUESTIONS: *Hawaiian Islands.* — (1) Name the two largest islands. In what latitude do they lie? (Fig. 511.) (2) On what island is Honolulu? Hilo? (3) How deep is the ocean near these islands?

Guam and Samoa. — (4) In what latitude is each? (5) What harbor on the island of Tutuila? (6) How deep is the ocean near these islands? (7) Find each on Figure 511.

Philippine Islands. — (8) Where are these located? (Fig. 511.) (9) Name the two largest islands. (10) What should you expect the climate to be? (11) Find Manila. On which island is it situated?

FIG. 173 (upper).
A Philippine house. Notice that it is built so as to raise it above the damp ground.

FIG. 174 (lower).
Natives and a water buffalo working in a sugar-cane field.

ests, there are many valleys that have been cleared for farming. In these the soil is usually deep and fertile, being formed by the decay of lavas, limestones, and other rocks rich in plant food.

The Pacific cable, connecting the Philippine Islands with the United States, was completed July 4, 1903; the final section of the cable from Manila to Shanghai was finished April 11, 1906. The cable, which varies in size from one inch in diameter in deep water to two inches at the shore ends, is 9111 miles long, is laid at an average depth of over $3\frac{1}{2}$ miles, and extends from San Francisco to Shanghai, China, by way of Honolulu, Midway Islands, Guam, and Manila, affording rapid communication between the United States and the Pacific possessions, and being of the greatest commercial value.

Climate. — Besides earthquakes and volcanoes, the Philippines are visited by terrific tropical storms or hurricanes which are called *typhoons*. Commencing in the heated belt near the equator, they develop intense energy, and move slowly off into the temperate latitudes. They are accompanied by a terrific downpour of rain and by winds so violent that houses are torn to pieces and trees dragged out by their roots. During these storms much property is destroyed, and many lives are often lost.

FIG. 175.

Philippine natives and the domesticated buffalo.

As in the West Indies, the climate of the Philippines is that of the tropics — always warm, and sometimes very hot, especially at a distance from the sea. They have a heavy rainfall, the year being divided into the dry and rainy seasons. The former comes during the winter months, the latter in the summer. The dry period lasts while the winds blow from the northeast, and then the fields often become parched and cracked, and the roads very dusty. In the summer, however, the winds change to the southeast, and as they blow from the warm, humid equatorial belt, they deluge the islands with rain to such an extent that much of the country becomes a swamp, and travel is almost impossible. The showers are local; and while a heavy downpour

occurs in one place, a short distance away on the leeward slopes there may be no rain.

The natives have domesticated a native wild animal, the water buffalo (Fig. 175), which is so accustomed to the mud that it may be driven about during the wet season. This draft animal is of great use, especially in the rice fields, which are kept wet during the growing season. The buffalo prefers wet walking to dry, and, in fact, must have a daily plunge in the mud and water.

Because of this damp climate, the Philippine houses are so built that the lower story is used for storage, as a cellar is in our country. This raises the inhabited part of the house above the damp ground (Fig. 173).

Resources and Industries. — Owing to the tropical warmth and dampness and to the excellent soil, the uncultivated parts of the islands are covered with a dense tropical forest, containing many valuable woods. As in other tropical forests, there are immense numbers of animals, especially insects, serpents, and beautiful birds. Among the serpents are the huge python and the deadly *cobra de capello*. There are also deer, apes, wild hogs, wild buffalo, huge bats, and man-eating crocodiles.

The inhabitants of the Philippines number from eight to ten millions, about one half of whom are civilized; but there are still many savages on some of the islands, especially in the dense forests. Two very different races occupy the islands, — the aborigines and the *Malays*. The former, a race of small, dark-skinned savages, are called *Negritos*, a Spanish word meaning little negroes. They have been gradually forced to retreat to the forests by the more powerful and intelligent Malays. Besides the Negritos, the various tribes of Malays, and the half-breeds, many Chinese traders and Spaniards live on the islands.

Under the influence of the Spaniards, the more civilized tribes, whom Magellan found in a savage state, have cleared the land and have reached a fairly high grade of civilization. Their wants are few, and very little work suffices to keep them supplied with what they need. Cocoanuts and bananas are easily obtained, and rice, yams, and other plant foods may be raised with very little effort. There is, therefore, no special reason for working hard; and, in fact, in that climate hard work is almost impossible.

The riches of the forest are scarcely utilized at all. Among the valu-

able woods are ebony, the rubber tree from which gutta percha is obtained, and a palm from the sap of which alcohol may be made. Cinnamon, cloves, and pepper also grow there.

The mineral resources appear to be extensive, although almost entirely undeveloped, since the Spaniards never encouraged mining there. Gold is known to exist in Luzon, and silver, coal, petroleum, marble, and sulphur also occur.

Aside from plant products consumed at home, some cocoa, coffee, sugar (Fig. 174), and tobacco are raised for export, the latter being manufactured into cigars at MANILA. This is almost the sole manufacturing of importance, and the inhabitants depend upon Europe and America for all but the very simplest materials, which they themselves produce.

Hemp is the best-known export of these islands, which supply the world with the fiber used in making the better grades of Manila rope. Hemp is made from the fiber of a wild plantain, which so closely resembles the banana that an inexperienced person cannot easily tell the two apart. In order to obtain the fiber, the plant is cut and allowed to wilt for a short time, then drawn between a block of wood and a knife, in order to scrape the pulp away. The fiber is spread for several hours in the sun to dry, and then pressed into bales for shipping. Since the work is crudely done by natives, without the aid of machinery, about 40 per cent of the fiber is wasted.

FIG. 176.

A Philippine lumber yard, where bamboo is the lumber. Compare this with Figures 40 and 140.

The castor bean grows wild on many of the islands, and its oil is extracted for many local purposes. Cocoanut palms also flourish, and great rafts of cocoanuts are shipped down the rivers to the sea. From this nut an oil is made that is used in lamps and sometimes in the manufacture of a substitute for lard. Much of the dried meat of the nut, called *copra*, is shipped to Europe and the United States to be used in soap making.

One of the most remarkable plants of the island is the rattan, which is put by the natives to a thousand uses, such as making ropes, houses, canoes, frames, carts, beds, and chairs. Many of the natives make a liv-

ing by splitting and marketing the cane. The bamboo is also of great value, being considered indispensable by the natives (Fig. 176). This plant grows from one inch to eighteen inches in diameter, and from five to seventy feet in height. It is used in making the frames, sides, and even the roofs of houses, and also rafts, boats, agricultural implements, bows, bowstrings, arrows, spoons, forks, and many other articles.

Under Spanish rule the people of the Philippines were greatly oppressed, and the industries were only partly developed. Large portions of the islands were left in a wild state; and even in the best-settled regions little attempt was made to develop the resources. The islands are able to produce not only quantities of sugar, rice, tobacco, coffee, and cocoa, but also much more hemp than at present. What has been said about the valuable forest and mineral products?

There is a promising future in the proper development of all the resources of these islands, and the civilized natives are able to help in the work. Many of them are educated and cultivated, living in excellent homes and surrounded by luxuries. In religion, most of the inhabitants belong to the Roman Catholic faith, which was early introduced by the Spaniards. However, the natives of the Sulu Islands, called *Moros*, are Mohammedans. These Moros are ruled by a Sultan under the general guidance of the United States.

Cities. — In the Philippine group there are many cities having a population of more than ten thousand. However, there is at present only one city of great importance in the archipelago, namely, MANILA, on the island of Luzon. It is situated upon an excellent harbor, and was for a long time the center of the Spanish government in the Philippines.

REVIEW QUESTIONS AND SUGGESTIONS

Alaska: QUESTIONS. — (1) From whom was Alaska obtained? How? (2) Describe the climate. (3) Name and locate the capital. (4) What are the surface features? (5) Locate the Muir Glacier. (6) Tell about the volcanoes. (7) What kinds of fish are found? (8) Describe whaling. (9) Tell about the seals: — where found; habits; efforts to protect them; their value. (10) Describe mining in Alaska: — minerals found; location of the gold mines.

SUGGESTIONS. — (11) Collect some whalebone. (12) Collect pictures of Alaska. (13) Find out what people thought when the purchase of Alaska was being considered. (14) Try to find some one who has been in Alaska, and have him tell you about the country. (15) How does the area of Alaska compare with that of the United States proper? (16) Measure the length of the Yukon, and compare it with the Mackenzie. (17) Draw an outline map of Alaska.

Cuba and Porto Rico: QUESTIONS. — (18) Name the principal islands of the West Indies. (19) Tell about their relief; their climate. (20) What is the reason for the heavy rains of summer? (21) What about the forests and their peculiar products? (22) The minerals? (23) Name the principal farm products. (24) Tell about the inhabitants. (25) Why so little manufacturing?

SUGGESTIONS. — (26) Estimate the length and the average breadth of Cuba. (27) How do its two leading cities compare in size with the two largest in Pennsylvania? (28) What products of Cuba and Porto Rico are also raised in the United States? Where? (29) State some advantage that Cuba enjoys over Louisiana in the production of sugar. (30) In what respects are the inhabitants similar to those of Mexico? (31) How is our control of these islands liable to prove of benefit to us? (32) Make a sketch map of Cuba and Porto Rico.

The Hawaiian Islands: QUESTIONS. — (33) Where are the islands? (34) How have they been formed? (35) Tell about the volcanoes. (36) About the climate. (37) Name the leading products. (38) The principal cities. (39) How did the islands come into our possession? (40) Of what use are they to us?

SUGGESTIONS. — (41) Why should you expect much the same products in the Hawaiian Islands as in Cuba? (42) Why is not the summer very hot in this tropical region? (43) What city on the eastern coast should be associated with San Francisco as important for refining sugar? (44) Explain the presence of many Chinese and Japanese in these islands.

The Philippine Islands: QUESTIONS. — (45) Name the two largest islands. (46) How have the islands been formed? (47) Tell about the earthquakes. (48) The soil. (49) The rivers. (50) About the typhoons, and the dry and rainy seasons. (51) What about Philippine houses? Draft animals? (52) Tell about the forests and wild animals. (53) About the native inhabitants. (54) About the farm products. (55) About the Pacific Cable.

SUGGESTIONS. — (56) Compare the latitude of the Philippine islands with that of the West Indies and of the Hawaiian Islands. (57) Tell about Dewey's capture of Manila. (58) Name the dependencies of the United States. (59) How did we obtain each?

For REFERENCES, see *Teacher's Book*.

FIG. 177.

Sitka Harbor and Mt. Edgecomb, Alaska.

XI. COUNTRIES NORTH OF THE UNITED STATES

Canada and Newfoundland

As we have learned, the northwestern extremity of North America is in possession of the United States; but almost all of the remaining land north of our country belongs to Canada.

History. — While the British were founding the thirteen colonies, the French occupied the coast of eastern Canada and made settlements along the St. Lawrence valley, as at Quebec and Montreal. Even now four out of every five persons in the Province of Quebec speak French as their mother tongue. The French and English were often at war; but finally England, aided by her colonies, acquired control of all the French possessions north of the United States, except the small islands of *Miquelon* and *St. Pierre*, which are still retained by the French as fishing stations.

After the Revolutionary War, Canada still remained in the possession of Great Britain. There were at first several colonies, or *provinces*, with separate governments, though all were under the control of Great Britain; but in 1867 a union was formed called the Dominion of Canada. Each of the nine provinces — Nova Scotia, Prince Edward Island, New Brunswick, Quebec, Ontario, Manitoba, Alberta, Saskatchewan, and British Columbia — now has a government of its own, as our states have; but by their union they also have a central government with the capital at Ottawa, which corresponds to our capital at Washington.

Besides these provinces, there are the Yukon Territory, the district of Keewatin, and also a number of unorganized territories, or territories without a regularly organized government. Most of the latter are practically a wilderness and of little importance at present. Their names will be found on the map (Fig. 178).

Newfoundland has refused to join this federation, so that, while still a province of Great Britain, it has no connection with Canada. Under the government of Newfoundland is included not only the island, but also the east coast of Labrador.

FIG. 178.

MAP QUESTIONS. — (1) Trace the boundary line between United States and Canada. (2) Which states border on Canada? (3) Why are there so many lakes in the Dominion? (4) Name the seven largest (including the Great Lakes). (5) Name the five largest rivers. (6) Where are the large cities? (7) What are the names of the largest? (8) Can you see any reasons for their location? (9) Trace the Arctic Circle across Canada. (10) Compare the latitude of Labrador with that of England (Fig. 511). (11) Draw an outline map of Canada.

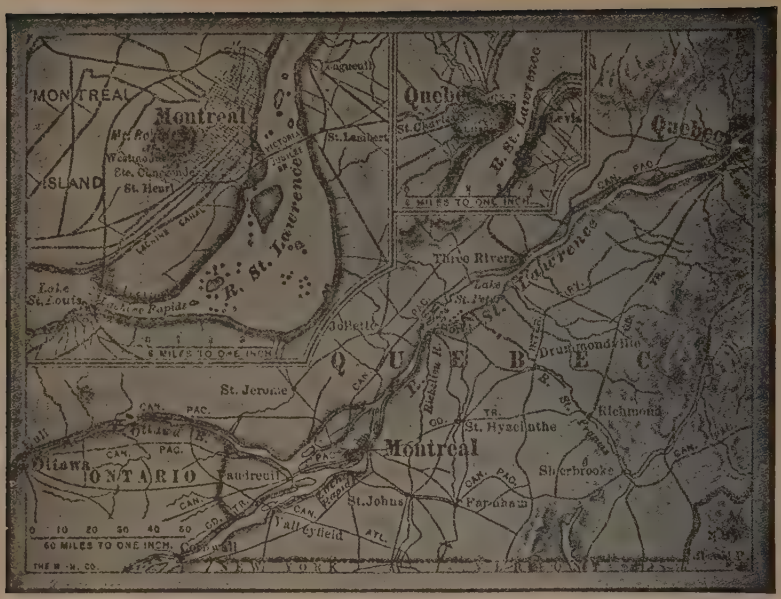


FIG. 179.

Map showing the location of Montreal and Quebec.

FIG. 180.

A view of Montreal from the mountain back of city — the St. Lawrence in the distance.

As in the case of the United States, the early settlements in Canada were made in the east, though westward migration has now opened up not merely the interior, but even the mountainous western part. At present, the population is over five millions, more than one fourth of whom are French.

Physiography and Climate. — The climate of southern Canada is similar to that of northern United States, though of course slightly cooler. Its physiography is nearly the same also; and since the glacier, which spread over northeastern United States, had its origin in Canada, the effects are found there, as here. Lakes, falls, and rapids abound, and the soil is made of glacial drift.

The surface of eastern Canada is much like the surface of New England; and, as in New England, there is much beautiful scenery. That section of Canada which lies north of Ohio and New York is more level, like those states. It is one of the most important farming regions in the Dominion. Farther west, north of Dakota and Montana, are broad plains (Fig. 185), arid in the western part, and increasing in elevation to the very base of the Rocky Mountains. After crossing these plains, the Canadian Pacific Railway, which extends from the Atlantic to the Pacific coast, follows the valleys among the mountains, and climbs to the passes amidst canyons, glaciers, and snow-capped peaks (Fig. 181). Name the mountains (Fig. 178). The scenery of this region is wonderfully grand and picturesque, and the railway passes through the midst of it. A portion of this wonderland has been set aside as a national park by the Canadian government.

FIG. 181.

A view among the mountains of British Columbia, through which the Canadian Pacific passes.

The headwaters of the Yukon River, mentioned under Alaska (p. 180), are in Canada; and farther east than this is the Mackenzie River, one of the largest on the continent. It is 2000 miles long. What three large lakes drain into the Mackenzie? Why is that river of little use for navi-

gation? What other large Canadian rivers drain into northern waters? How would they be more useful if they drained southward, as the Mississippi does?

Canada shares with the United States the privileges of navigation on all the Great Lakes, with one exception. Which is it? In addition to these great waterways, the lower St. Lawrence is entirely in Canada; but on account of the severe winters this is not so great an advantage as might at first appear. Why?

There are numerous rapids in the St. Lawrence, over which vessels cannot pass; but large ship canals have been built around these. Now, therefore, all but the large ocean steamers are able to go from the open ocean to the western part of Lake Superior, a distance of twenty-four hundred miles. In this respect the Canadian route has a great advantage over the Erie Canal route, upon which only small canal boats can go. However, there is work in progress to deepen the Erie Canal so that vessels of 1000 tons can pass through it.

Although southern Canada closely resembles the United States in climate and physiography, toward the north the country rapidly grows colder, until, in the extreme northern portion, the climate is frigid. There the sea is frozen over in winter, and in summer it is covered with floating ice (Figs. 265 and 266). Even in midsummer large patches of snow are seen upon the land.

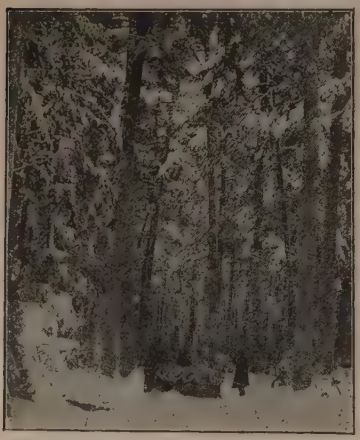


Fig. 182.

A winter scene in the woods of New Brunswick.

Lumbering.—The forests which cover northern Maine, New Hampshire, and Vermont extend into the hilly and mountainous section of New Brunswick and southern Quebec. In fact, from there westward to the Pacific, sweeping northward around the vast plains of Manitoba, this forest tract is from two to three hundred miles wide, and is estimated to include fully a million square miles. In the east the principal trees are spruce, balsam fir, pines, and maples, while in the west are spruces, mammoth cedars, sometimes sixty feet in circumference, and the Douglas fir, which in some instances attains a

height of three hundred feet. This forest is so nearly in its primitive state that there are few parts of the continent where the hunting for large game is so good.

At present the woods of Canada are one of its greatest sources of wealth; the lumbering industry is so important that there are hundreds of sawmills at the rapids on the streams, and even in the great cities. Among the latter, OTTAWA, TORONTO, and MONTREAL are important, especially in the manufacture of lumber into such articles as doors, blinds, barrels, and furniture.

Fishing. — It was the excellent fishing off the eastern coast of Canada that first attracted the French to America, and fishing is

FIG. 183.

Boats setting nets to catch salmon off the coast of British Columbia.

still an important industry in Canada. Fully fifty thousand people in Newfoundland and the eastern provinces, especially Nova Scotia and Prince Edward Island, are engaged in cod fishing. One of the best fishing ports is YARMOUTH in Nova Scotia, although a great deal of fishing is carried on from HALIFAX, Nova Scotia, ST. JOHN'S, Newfoundland, and many other places. Inland fishing is also important, for the streams and lakes still abound in trout, pickerel, whitefish, bass, and salmon.

There is much fishing also on the west coast, especially for salmon. Great numbers of salmon come to the Canadian rivers

every year to spawn, pushing their way upstream, in spite of many natural obstacles. Sometimes, in order to get beyond waterfalls, they must leap several feet into the air (Fig. 155), and it is interesting to watch the skill with which they are able to spring out of the water and land in the foaming torrent at the crest of the falls.

Fig. 184.

Hundreds of salmon in a cannery.

Sometimes they fail, but returning to the task, they try again and again until successful. It is believed that a salmon always returns to the same river.

While traveling up the streams they are easily caught in nets set across the current (Fig. 183), or by dip nets in the hands of fishermen (Fig. 155), or sometimes by salmon wheels (Fig. 156). Immense numbers of salmon are canned in western Canada (Fig. 184) as well as along the Columbia River and in Alaska.

Sealing. — We have already learned (p. 178) about the seal fishing in Alaska. Seals are also found on the eastern side of Canada, but their fur is of little value. It is the layer of fat, or blubber, just beneath the skin, that is chiefly sought, because it is useful in the manufacture of oil. The Labrador seals rear their young on the fields of floating ice that drift southward in the Labrador current (Fig. 266). To reach these animals, strongly built steamers (Fig. 265) start out from St. John's, Newfoundland, in the early spring, as soon as the ice has begun to break up enough for ships to push their way through. Upon reaching a group of seals, scores of men rush out upon the ice and kill as many as possible (Fig. 190); then they return to each body to remove the skin and blubber.

Agriculture and Ranching. — What was said about the agriculture and grazing of northern United States applies quite fully to Canada. The warm, damp winds from the Pacific render the climate of southern British Columbia much like that of Washington (p. 150).

Farther east, especially on the plains at the base of the Rocky Mountains, in the provinces of Alberta and Assiniboia, the climate was at first thought to be too arid for farming, but large areas have

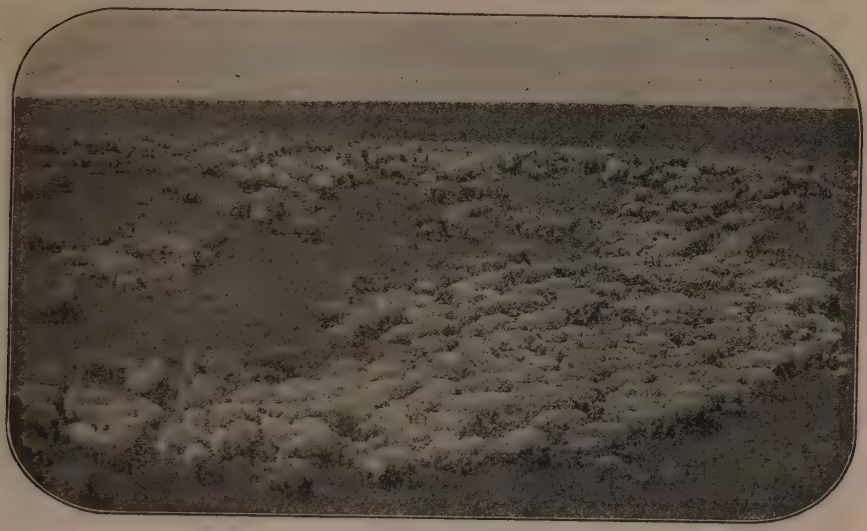


FIG. 185.

Sheep on the plains of western Canada.

been found to be suited to grains. Immense herds of sheep (Fig. 185) and cattle are reared on these broad plains, in the midst of which are several towns. The largest of these is CALGARY, which has a population of about four thousand.

In Manitoba the climate begins to be more favorable for agriculture, and the wheat fields found in Minnesota and eastern Dakota continue across the boundary far up into that province. Although the winters are long and exceedingly cold, the summers are warm, so that grain, especially wheat (Fig. 186), oats, and barley, may be raised there.

In the center of this great wheat region is the city of WINNIPEG, in which flour is manufactured, as in Minneapolis, and from which much grain is sent eastward by rail. This city is situated on the

banks of the Red River of the North, which empties into Lake Winnipeg.

Farther east, on the peninsula between Lakes Erie, Huron, and Ontario, is found the best farm land in Canada. This district is in the province of Ontario, the most populous of the Canadian provinces, which includes nearly half of all the people in Canada. More than two thirds of the inhabitants live outside of the large cities. What large cities do you find there?

Although this country is so far north, its climate is so modified by the water of the Great Lakes, that such crops as grapes, peaches,

FIG. 186.

A wheat field in Manitoba.

corn, and even tobacco are raised. In addition, great quantities of oats, wheat, barley, and a considerable amount of flax are grown there. The wheat is made into flour, mainly for home consumption; much of the barley is sent to the breweries of the United States, and the oats are fed to stock. Some of the finest horses in America are reared in Ontario. This province is further noted for its great amount of cheese.

A strip of excellent farming country is found practically the entire length of the St. Lawrence River and along the southern shores of the Gulf of St. Lawrence. Prince Edward Island is an island of fine farms; but the people in the towns, especially CHARLOTTETOWN, the capital, are engaged in commerce and fishing. Portions of Nova Scotia and New Brunswick, particularly along the coast and in the valley of the St. John

River, are also farming districts. In fact, one of the most beautiful farming regions in all of Canada is in southwestern Nova Scotia, noted for many crops, but especially for delicious apples. It was there that the French settlements were made about which Longfellow has written in his "Evangeline"; and this is often called "The Land of Evangeline."

Mining. — Gold and silver are mined in British Columbia, as in the Rocky Mountains farther south; but there has been far less development of mining in Canada than in the United States. Not only are there gold and silver, but also lead and copper ores, building stone, and coal. Deposits of coal are found both among the mountains and in the plains farther east.

The famous Klondike region is situated in the Yukon Territory, near the Alaskan boundary. Although so near the Arctic Circle, DAWSON CITY in the Klondike has rapidly grown to a city with over 10,000 inhabitants. The discovery of gold so near the Alaskan boundary, thus causing that section suddenly to become of importance, gave rise to a dispute between the United States and Canada as to the exact location of the boundary lines which was a long time in process of settlement.

Gold and silver are found in the province of Ontario, especially in the vicinity of the Lake of the Woods. Nickel is mined in Ontario, and some oil fields have been developed. A small quantity of gold is obtained in Nova Scotia and in Newfoundland, where some copper is also mined.

In spite of the abundance of iron ore in certain places, the scarcity of coal near at hand has prevented Canada from producing much iron. The coal fields of western Canada are quite inaccessible to the eastern cities, and the coal beds of the east have never been thoroughly developed. In Nova Scotia, particularly on Cape Breton Island, there are extensive beds of bituminous coal of the same origin and age as those of Pennsylvania. Recently great blast furnaces have been erected at SYDNEY, Cape Breton, leading to the development of an important iron manufacturing industry in the coal fields. Since these mines are on the very seacoast, and often on the shore of excellent harbors, the coal is readily loaded into ships; but the fact that the St. Lawrence is frozen in winter is a great disadvantage, not only to the cities along the rivers, but also to the coal mines.

Trade Routes and Cities. — There appear to be two outlets for eastern Canada, — one by way of the St. Lawrence, the other by way of Hudson Bay. But the latter is practically useless because floating ice so clogs the narrow Hudson Strait that vessels are able to pass through it during only a few weeks of summer.

The St. Lawrence River suffers from the same disadvantage, though to a much less extent; and, in addition to the ice, there are dense fogs where the damp air from the Gulf Stream is chilled in passing over the cold Labrador current (Fig. 266). But in spite of these objections, the St. Lawrence offers a much better water route than that which has so greatly influenced the growth of New York (p. 84). However, New York has such a productive territory to draw upon, that it has grown far more rapidly than Montreal.

The exact location of MONTREAL (Fig. 179), the principal city in Canada, is easily explained. It is on the St. Lawrence, at the mouth of the Ottawa River, and just below the Lachine Rapids

FIG. 187.

A railway bridge across the St. Lawrence at Montreal, showing what a very broad river it is. Notice how small the long train of cars is when compared to the length of the bridge. There is no bridge across the river below Montreal.

which furnish a complete barrier to the passage of boats upstream. However, by entering the canals mentioned on page 194, river and lake boats may go up the St. Lawrence; but ocean vessels must stop at Montreal. Thus goods from Europe may be carried to Montreal, fully a thousand miles from the ocean; then, by transferring to other ships, they may be carried on canals, rivers, and lakes as far as Duluth, more than twelve hundred miles farther inland. By this means, and by railways also, raw products from the north, east, south, and west collect at Montreal, either to be manufactured, or to be shipped farther.

As in the large cities of the United States, manufacturing in Montreal is varied, including the making of sugar, boots and shoes,

cotton and woolen clothing, India-rubber goods, various steel and iron products, cigars, and multitudes of other articles.

Farther down the river is QUEBEC (Fig. 179), a city especially noted on account of its historical associations. It was the center of the French government in Canada, and for a long time the principal city. It is situated upon a high bluff of the St. Lawrence, and is fortified so as to command that river.

For a long time Quebec was engaged in commerce to a greater extent than Montreal; but the better location of the latter city has drawn the commerce away from Quebec, as the better situation of Boston drew the commerce away from Salem (p. 63). This has been greatly aided by the building of ship canals and by the dredging of the St. Lawrence, thus deepening the channel so as to admit great ocean vessels as far as Montreal.

Quebec is one of the quaintest and most interesting cities on the continent. It resembles a bit of the Old World, transplanted to America, and a visitor from the United States feels that he is indeed in a foreign country. Besides trading and commerce, there is some manufacturing in Quebec, particularly the manufacture of boots and shoes.

OTTAWA, another city of great importance, is above Montreal, at some large falls in the Ottawa River. On account of its fine water power, Ottawa has much manufacturing, and is especially noted for sawmills and other lumber manufactories. More than that, being the capital of the Dominion, it has some beautiful government buildings, known there as the *Parliament Buildings* (Fig. 188).

The second city in size in Canada is TORONTO, located on an

FIG. 188.

The Parliament Buildings, Ottawa.

excellent harbor on the shores of Lake Ontario. Being situated in the midst of a fertile farming country, and having water connection with coal on the east, and lumber and other raw products on the west, Toronto has become a manufacturing center. Yet, in spite of this, the inhabitants have paid great attention to keeping the city beautiful, and it is one of the most attractive cities on the continent.

Railways have been of great importance in Canada, as in the United States. The greatest railway is the Canadian Pacific, which reaches from St. John, New Brunswick, entirely across Canada, to VANCOUVER on the Pacific coast. It is the shortest route from England to China and Japan, and much freight is sent that way. Across the strait, on the island of Vancouver, is the city of VICTORIA. With what two cities on Puget Sound may these be compared? How do they compare in size? (See Appendix, pp. vi and viii).

One of the oldest cities in Canada, and one that has an excellent harbor, is HALIFAX in Nova Scotia, which is about the size of Mobile in the United States. The reason why it has never become very large is easily seen on examining the map (Fig. 178). There is almost no country behind it upon which it can draw to aid its growth. The narrow peninsula of Nova Scotia is not large enough to supply raw materials and manufactured articles in sufficient quantity to make it a great shipping point, and the country farther west is too difficult to reach. It is very much easier to send western goods to Montreal for shipment than to carry them as far as Halifax. Here, almost as well as in the case of New York and Montreal, we see why certain cities flourish or fail to flourish.

ISLANDS NORTH OF NORTH AMERICA

These cold and barren islands have almost no inhabitants. Scattered colonies of Eskimos are living along the coast (Figs. 27, 189, and 192), many of them in almost as primitive a manner as when the continent was discovered.

These people have adapted themselves to life in the Arctic region in a way that is truly remarkable (p. 30). They have no wood except the occasional pieces which drift to their shores; they lack vegetable food, except the few berries that are found in summer; and the land supplies them with almost nothing beyond a few birds and the caribou; yet they are able to exist, notwithstanding the terrible cold of the long, dark winter.

From the seal, polar bear, walrus, and caribou the Eskimos obtain not only their food, but furs for their clothing, skins for their *tupics*, or summer tents, and blubber for their light and fuel. In fact, except for the stones and snow used in their winter homes, or *igloos* (Fig. 27), and occasional pieces of driftwood, they are dependent entirely upon animals for everything they use.

They are a happy and intelligent people. The latter fact is proved by the kinds of boats, sledges, and homes that they have

FIG. 189.

Eskimo women at Cape York, Greenland. Behind them is the summer tupic, or skin tent.

invented, and also by the fact that they are able to live at all amid such surroundings. Their struggle for existence is probably greater than that of any other race. On the west coast of Greenland they are under the control of the Danes, who trade with them for skins, walrus ivory, blubber, and eider down. The most northern of the Danish trading stations is UPERNIVIK, where white men live farther north than any others in the world. But some uncivilized Eskimos have homes still farther north.

Away from the coast the greater part of Greenland is a barren waste of ice and snow — the most absolute desert known in the world (p. 13). Its area is about five hundred thousand square miles, or more than ten times as large as New York State. Throughout

this area there is no living thing. In the interior, where the elevation is over ten thousand feet, the temperature, even in midsummer, remains below zero, and rain never falls.

This snow forms a great ice sheet which moves out in all directions toward the sea; and there the end of the glacier rests in the sea (Fig. 14); as it pushes out into the deeper water, great masses are broken off, forming icebergs (Figs. 14 and 191).

Review Questions and Topics. — (1) Tell about the French in Canada. (2) What provinces constitute the Dominion of Canada? Locate each. (3) What about Newfoundland? (4) Where do the majority of Canadians live? Why there? (5) Compare southern Canada with the United States in physiography and climate. (6) Where is some of the grandest scenery? (7) The best farm land? (8) Name and locate the principal rivers. (9) What is the principal water route? (10) Mention some of the difficulties of shipping by that route. (11) Describe the climate, physiography, and vegetable life in northern Canada. (12) In regard to lumbering, tell about the extent of forest; kinds of trees, and cities most noted for lumber. (13) What provinces in the east are especially engaged in fishing? (14) Name the important fishing ports. (15) Tell about the salmon of the western coast. (16) Compare sealing in Alaska with that on the coast of Labrador. What use is made of the animals in each case? (17) Compare the agricultural products of Washington with those of British Columbia. Why so similar? (18) What is the principal occupation in Canada just north of Montana? Why? (19) Tell about the province of Manitoba. (20) Which is the most populous province in Canada? Why? (21) Where is "The Land of Evangeline"? (22) What mineral products are found in Canada? (23) Locate the chief mining regions. (24) Where are the leading coal mines? (25) Why is Hudson Bay not an important outlet for Canada? (26) How does the water route from the Gulf of St. Lawrence to Port Arthur compare with that from New York Bay to Duluth? Name particularly the advantages of each. (27) Give the reasons for the location of Montreal. (28) Mention the leading industries of that city. (29) Tell about each of the other cities mentioned. (30) Tell about the Eskimos. (31) What is the condition in Greenland?

Suggestions. — (1) Compare the area of Canada with that of the United States. (Appendix, pp. i and iii.) (2) The population also. (Appendix.) (3) Collect pictures of different kinds of trees in Canada. (4) Tell the story of "Evangeline." (5) Lake Ontario is how much higher than Lake Erie? How are ships able to pass from one lake to the other? (6) Explain why Montreal has outgrown Quebec. (7) Why should Buffalo grow more rapidly than Toronto? (8) Find some one who has been in Canada, and have him tell you what he has seen there. (9) Find out more about the government of Canada. (10) Of what advantage is it to England to have such a large, productive colony? (11) Write a story describing the pleasures of the Eskimos.

For References, see *Teacher's Book*.

FIG. 190.

Newfoundland sealers killing seals off the coast of Labrador.

FIG. 191.

A Greenland Eskimo kayak.

FIG. 192.

A group of Eskimo children in Greenland.

XII. COUNTRIES SOUTH OF THE UNITED STATES

Mexico

Physiography and Climate. — Mexico consists of four areas of different altitudes. Near the sea are coastal plains and other lowlands. In the interior, occupying a large part of the country, is an arid plateau (Fig. 196). The third area includes the slopes

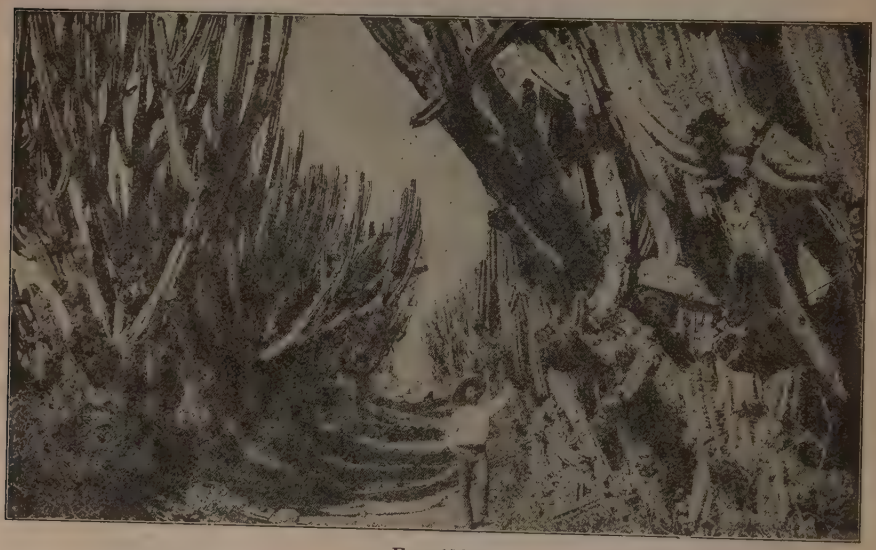


Fig. 193.

A scene on the arid plateau of Mexico. A road bordered by cactus.

between these two, and the fourth consists of peaks and mountain ranges which are a continuation of those in southern United States. Among the mountains, as in the United States, there is a number of volcanic cones, two of them, Orizaba and Popocatepetl, being among the highest peaks on the continent.

This part of North America is narrow, and since the north and south divide causes some of the streams to flow eastward and the others westward, there can be no long rivers in Mexico. The steep slope

FIG. 194.

MAP QUESTIONS: *Mexico.* — (1) Describe the relief of Mexico. (2) Name the two large peninsulas. (3) What river forms a part of the northern boundary? (4) What waters border Mexico? (5) Find the capital. (6) Find the largest seaport. (7) Compare the coast line with that of northeastern United States.

Central America. — (8) Name the countries. (9) What sea lies to the east? (10) What large lake do you find? (11) Examine the small map of the Nicaragua Canal. Describe the route proposed. Of what advantage is the lake? Trace the route of the proposed Panama Canal.

FIG. 195 (upper).
Interior of a Mexican home of the poorer class.

FIG. 196 (lower).
View of a part of the arid plateau of Mexico, with mountains in the background.

from the plateau to the lowland gives the streams a rapid fall, so that they have cut deep canyons in the edge of the plateau. Moreover, the arid climate of the interior allows them little water. This lack of large navigable rivers has interfered with the development of Mexico. Can you suggest why?

In the main the movement of the land along the coasts of Mexico has been upward. Therefore the coast is regular and there are few good harbors. Two projections form the peninsulas of Yucatan and Lower California, the former being a continuation of the mountain chain which made Cuba, Haiti, and Porto Rico. Lower California is a southern extension of the Coast Ranges of the United States.

If the surface of Mexico were near the sea level, the climate of the greater portion would be tropical; but owing to the differences in altitude, there are several different climates. The low coastal plains, near Vera Cruz and in Yucatan, are hot and damp, being reached by the winds which blow across the Gulf of Mexico and Caribbean Sea. There is also much rain upon the cooler plateau slopes of eastern Mexico; but with the exception of these regions, the greater part of Mexico has too little rainfall for agriculture without irrigation.

History. — After Columbus discovered the West Indies, the neighboring coast was visited and settled, and thus the Spaniards naturally came into possession of Mexico. One of the boldest of the Spanish invaders was Cortez, who conquered the Aztec and Pueblo Indians as far north as northern New Mexico.

Spain found so much gold and silver in Mexico that many Spaniards settled there. They developed the mines, started coffee plantations on the temperate slopes, established farms on the plateau where irrigation was possible, and carried on cattle ranching in the more arid portions. The intermarriage of Spanish and Indians caused the population to become very much mixed; and there are now in Mexico not only savage Indians and semi-civilized Aztecs, but many half-breeds, besides some pure-blooded Spaniards.

Spain governed Mexico so badly that the people rebelled, and in 1821 won their independence, establishing a republic with a government modeled after our own. There is a number of states, each with a government and capital, somewhat as in each of our states, and a central government with the capital at MEXICO CITY, where the President lives. For a long time Mexico also included Texas.

a part of Colorado, and the country west of them to the Pacific. Texas won its independence by war and joined the Union; and by the Mexican war the United States obtained the territory marked "ceded by Mexico, 1848," in Fig. 240.

FIG. 197.

A Mexican plowing with a wooden plow.

Agriculture and Ranching. — Although the climate of a large part of Mexico is arid, much agriculture is carried on by the aid of irrigation, which is made possible by reason of the snow and rain among the mountains. On the irrigated farms the products of the temperate zone are raised, such as wheat, corn, and beans — the latter being one of the staple elements of the Mexican diet. Much fruit is also produced, especially apples, pears, peaches, and grapes.

The Mexican farming methods, which are very crude, are a mixture of ancient Aztec customs and those introduced from Spain. In Mexico one may still see the wooden plow (Fig. 197), which barely scrapes the ground, and also the wooden wheeled cart, drawn by oxen (Fig. 31).

The home life of the people is interesting. Their houses have but one story and are commonly built of a brick made of clay mixed with straw, and then dried in the sun (Fig. 198). These sun-dried bricks, or *adobes*, are

FIG. 198.

An adobe house in Mexico.

larger than the bricks that we use, and are piled tier upon tier, being joined by layers of mud. Often there is but one room (Fig. 195), the ceiling being made of brush, and the floor of nothing but the earth or stones. In this one room the whole family cooks, eats, and sleeps. Their food usually consists of very simple materials, such as unraised bread, baked in the fireplace, beans, and occasionally meat, commonly cooked with red pepper.

Upon the arid plateaus, the plants resemble those in western United States (p. 25), and among them are found the sage bush, the mesquite, and the cactus (Figs. 23 and 193). One among them, known as the *maguey*, or *agave* (Fig. 199), is very widely used in Mexico. Its stout, sharp-pointed leaves rise from near the ground in a tuft. In the center of this rests the flower stalk, which sometimes reaches a height of forty feet, and bears a cluster of white flowers on the top. It is also called the *century plant*, because it requires so long (from ten to seventy years) to reach maturity and produce this flower stalk. From the fermented juice of this plant the Mexicans obtain an alcoholic drink known as *pulque*, and by distilling it, a drink known as *mescal*. The tough leaves contain a fiber which is made into paper and strong thread. So valuable is the maguey that it is carefully cultivated upon plantations (Fig. 199).

FIG. 199.
A field of maguey plants (century plants).

As in western United States, large parts of these arid plateaus cannot be reached by irrigating ditches. Such parts are valuable for cattle and sheep ranches. Horses and goats are also raised, but neither horses nor mules are used so much in Mexico as in the United States. The most common draft animal is the little *burro*, sometimes as small as a Shetland pony.

On the damp lowlands, rice, sugar cane, and cotton are produced; also tropical fruits, such as oranges, bananas, and pineapples, quantities of which are exported from southeastern Mexico. Upon the slopes between the tropical lowlands and the temperate plateau much tobacco and coffee are raised.

The latter requires a rich soil, abundant moisture, a warm climate, and plenty of shade. In order to secure shade, the coffee bush, which reaches a height of from ten to fifteen feet, is planted in the shade of higher trees. A white blossom appears as early as March, and after the flower falls off the coffee berry begins to grow. It resembles a dark red cranberry. On the outside is a husk inclosing two kernels that fit with the flat sides together; and in order to prepare the coffee for the market the outside husk must first be removed. This is sometimes done by the Mexicans in a very crude way; but on the larger plantations, machinery is employed.

Fig. 200.
The coffee berry.

Southern Mexico.—In southern Mexico, near Central America, there are dense tropical forests from which are obtained many valuable woods, such as mahogany, rosewood, and logwood. Elsewhere in that country forests are rare, except upon the higher mountains. In fact there is so little forest land that the Mexicans living on the arid plateau find difficulty in obtaining wood for fuel. Much of this is dug from the ground; for some of the arid-land bushes, notably the mesquite, have long, thick roots which make excellent firewood.

Besides the valuable woods of the tropical forests, southern Mexico produces the vanilla bean, which grows upon a climbing plant. In the seed-pod are nestled the very fragrant beans which are used for flavoring extracts, for perfumeries, and for medicine. Pepper, made from the dried berry of a tropical plant, is also obtained in Mexico. Indigo, useful as a dye, is likewise obtained from a berry in this region, and sarsaparilla from the roots of a tropical plant.

The Mines. — One of the principal objects that the Spaniards had in exploring the New World was to obtain the precious metals, gold and silver; and both in Mexico and South America they were rewarded in their search by the discovery of very rich mines, some

of them having been previously worked by the Indians. Mexico is still a great mining country, producing almost as much silver as the United States, and being therefore the second silver-producing nation in the world. There are also some mines of copper and lead.

Many of the mines are now operated by Europeans and Americans, so that modern methods have been introduced; but in some of those managed by Mexicans, primitive methods, similar to those used by the Indians, are still employed. Large areas have never been carefully examined for ore. In fact, some parts of the country are still occupied by Indian tribes, who not only prevent miners from coming in, but even defy the government.

The Cities. — While great numbers of Mexicans are engaged in farming and ranching, and are therefore scattered over the country, they have, wherever possible, gathered together in villages and small

FIG. 201.

The Mexican city of Leon.

towns. These communities are often necessary in order to obtain the water supply needed for irrigation. It is usually too great a task for a single farmer to build a ditch; and therefore a number combine and thus live close together.

In a few places, too, there are large cities, the greatest being MEXICO CITY, with a population of about 350,000. In this city, as in numerous other places in Mexico, there are many fine buildings, especially cathedrals; for the Mexicans, like Spaniards in other parts of the world, are chiefly Roman Catholics.

Another city in the interior is PUEBLA, founded in 1531, and now having a population of about one hundred thousand. It is situated near one of the ancient cities, or pueblos, of the Aztecs. SAN LUIS POTOSI is nearly as large as Peoria, Ill., and there are a number of other cities with a population of fifty thousand and over.

Since the eastern coast of Mexico is low and sandy, it has no good harbors, the two largest cities on the seacoast being TAMPICO and VERA CRUZ, whose harbors are protected by breakwaters. There are good harbors on the western coast, as that at ACAPULCO; but since it is backed by high mountains and a worthless country, that port has never become important.

Because of the ignorance of the working class, and the absence of water power and coal, there is very little manufacturing in Mexico; and that which is done is largely carried on by hand. However, even the uneducated Mexicans are artistic and do some beautiful kinds of handwork. There are large tobacco factories in the tobacco district. Some earthenware is also manufactured, and some cotton cloth; but there are no manufacturing towns, no great watch and shoe factories, and no immense blast furnaces, such as we find in many parts of the United States. But Mexico is now making rapid progress.

CENTRAL AMERICA

The Republics. — South of Mexico are five small nations, known as the Republics of Central America, each of which has a government modeled after that of the United States. They are, however, not good examples of republics, chiefly because of the ignorance of the people. An ambitious general, obtaining a few followers, is liable at any time to start a revolution and overturn the existing government. There is an almost constant state of turmoil in these nations; war after war has occurred; presidents have been deposed or murdered; and such a state of unrest has existed that there has been little chance for development. Their political condition resembles that of the country in which they live, which is subject to disastrous eruptions of volcanoes, and to earthquakes of great destructiveness. They truly live in a state of unrest.

The earthquake shocks have leveled towns and killed thousands of people. For instance, SAN SALVADOR, the capital of the country by that name, was so frequently destroyed by earthquakes that the inhabitants decided to choose a new location for their city; but the one they selected is hardly better than the one they abandoned.

Most of Central America is mountainous; and, being in the tropical zone, the climate is hot. The rainfall is heavy, especially on the eastern coast, where it is so rainy that there are dense jungles along the shores of the Caribbean Sea.

Fig. 202.

Loading a train with bananas in Costa Rica.

Of the five countries forming the Central American group, the smallest is San Salvador, the next, Costa Rica. Nicaragua, Honduras, and Guatemala are about equal in size. In addition to these, just south of Yucatan, is British Honduras (or Belize). The largest city in the group is New Guatemala, the capital of Guatemala, which has a population of over ninety thousand. Like San Salvador, the inhabitants have been forced to change its location, which was formerly at the base of two very active volcanoes; hence the name, *New* Guatemala.

Fig. 203.

Natives sorting coffee in Costa Rica.

A large portion of these countries is occupied by dense tropical forests, from which are obtained mahogany, rosewood, logwood, fustic, and other valuable cabinet and dye woods. The rubber tree also grows there, and the production of rubber is one of the industries of the region. As in Mexico, coffee is raised on the hill slopes in the shade of the forest trees. One of the most important districts for this industry is Costa Rica. Bananas (Fig. 202), sugar, tobacco, indigo, and cocoa are other products of Central America.

Some gold and silver are obtained, the former near Bluefields, the latter in Honduras.

The inhabitants are mainly Indians, Spaniards, and half-breeds; and owing to the uneducated condition of the great majority, and even the uncivilized condition of many, there is practically no manufacturing carried on in these countries.

The Panama Canal. — To us one of the principal points of interest connected with this region is the building of the Panama Canal across the narrow strip of land which separates the Atlantic from the Pacific. This Canal will connect the ports of Colon and Panama in the Republic of Panama. The distance is only about fifty miles and the elevation but three hundred feet at the highest point.

Another route for a canal, which at one time found favor in the United States, is the Nicaragua route. This is much longer than the Panama route, but it passes over an elevation only about half as great. A large part of the distance is occupied by a river and by Lake Nicaragua (Fig. 194), the largest lake in North America south of the United States.

After long consideration by engineers and experts, the United States government decided to build the canal by the Panama route and entered into treaty with the Republic of Panama for the absolute control and ownership of the work.

The canal will be of great service to the seacoast cities of North America and Europe. By the canal a steamer going from London to San Francisco will save five thousand miles, while eight thousand miles will be saved from New York to San Francisco. Examine the globe to see why more will be saved in the latter case.

The West Indies

(Map, Fig. 163.)

From the Yucatan and Florida peninsulas a chain of islands reaches to the mouth of the Orinoco on the South American coast. These islands inclose the Caribbean Sea; and, with the aid of the peninsulas of Florida and Yucatan, the Gulf of Mexico also. Because of the mistake made by Columbus, these islands are to this day called the West Indies. They are often known as the Antilles.

With the exception of the northern portion of the Bahamas, this entire archipelago lies within the tropics, and therefore has a warm

climate; and all have a damp climate. There are many scores of islands in the group, only a few of which are large. Two of these, Cuba and Porto Rico, have already been described (pp. 180 to 184). Tell what you can about them.

Jamaica. — South of Cuba lies the Island of Jamaica, the third in size in the West Indies, and a possession of Great Britain. Its capital is KINGSTON, a city nearly as large as Portland, Me. This island is mountainous in the center, but has an excellent soil on the lower slopes and in the valleys, and is very productive. The inhabitants are mainly negroes or mulattoes, there being fully forty negroes to one white person. The women do outdoor work fully as much as the men.

FIG. 204.
A field of sugar cane in the West Indies (St. Croix).

The occupation of the Jamaicans is chiefly agriculture. One of the main products is sugar cane, from which are made sugar, molasses, and rum. Early vegetables and fruits, such as oranges and bananas, are also raised. Jamaica ginger, of which every one has heard, is obtained from the root of a plant that grows in this island.

Haiti. — The first large island discovered by Columbus in 1492 was Haiti, and on it he made settlements and opened mines. The descendants of the Spanish slaves have now become free, after a very complex history, and have set up two negro republics, Haiti and Santo Domingo. The capital of the former is PORT AU PRINCE; and of the latter, SANTO DOMINGO. Many of the natives obtain their living in the most primitive fashion, like the negroes of Africa; but others, especially near the seacoast, are engaged in raising sugar, tobacco, coffee, and bananas.

Lesser Antilles. — Most of the islands among the Lesser Antilles are possessions of Great Britain, though some belong to other nations. For instance, Martinique and Guadeloupe belong to France;

St. Thomas and St. Croix to Denmark; and others to Holland. Many of these small islands are volcanic cones, built upon the crest of a mountain ridge which is mainly beneath the sea (Fig. 1). Most of the volcanoes now appear to be extinct, though in recent years in Martinique and in St. Vincent there have been violent volcanic outbursts. Hot water and steam still rise from the craters in other islands, showing that the volcanic fires have not altogether died out.

Fig. 205.

A tropical scene in the West Indies (St. Croix).

The products of these islands are similar to those of the other West Indies, the most important of all being sugar cane.

The Bahamas. — North of Haiti and Cuba are several hundred small islands, called the Bahamas. A number of these are inhabited, and on one is situated the city of Nassau. These islands have been built by coral polyps. In the warm waters of the Gulf Stream, which sweeps over the shallow bank on which the islands lie, these minute sea animals have built reefs. Waves have washed the dead coral fragments together, forming bars and beaches, and the wind has blown the coral sand into low sand-dune hills. In this way the islands have been made.

Sponges are obtained from the clear, warm waters of the Bahama banks. To obtain them, the natives either cruise about in boats, dragging the bottom, or they strip off their clothes and dive into the clear water, tearing the sponge from the bottom to which it is clinging.

From the land, early vegetables, pineapples, oranges, and cocoanuts are raised by the inhabitants, who are chiefly negroes. One of the industries on these islands is caring for winter visitors. Why should people wish to go there?

The Bermudas

Far out in the Atlantic, alone in mid-ocean, and 600 miles east of the Carolinas, is a cluster of small islands, known as the Bermudas, the largest being only 15 miles long by one or two miles in width. Being in the open ocean, and surrounded by warm currents, the Bermudas have a delightful and equable climate. In midwinter, when people in the same latitude in the United States are shivering with cold, those in Bermuda are able to sit out of doors late at night.

This group of islands, which belongs to Great Britain, is inhabited mainly by negroes and mulattoes, who are engaged in raising early vegetables, especially potatoes and onions, for the American market. Another important product is the Easter lily, great fields of which are raised for the Easter season. It is natural that many persons from the United States should be attracted to such a climate every winter. The majority of these visitors stay in the largest city, Hamilton.

Review Questions and Suggestions

Mexico: Questions. — (1) Describe the surface of Mexico. (2) Why are there few good harbors? (3) Tell about the temperature and rainfall in the different parts. (4) Give the history of Mexico: — the early settlement; the industries developed; the present government; the loss of territory. (5) Mention the leading products from the irrigated farms. (6) Tell about the methods of farming. (7) About the home life. (8) Name some of the plants on the arid plateaus; what products are obtained from the maguey? (9) What are the chief products on the damp lowlands? (10) On the slopes farther inland? (11) Tell about coffee raising. (12) In what part of the country are the forests? (13) Name the valuable woods. (14) Name the products of southern Mexico. (15) Tell about the mining of precious metals. (16) Locate the principal cities in the interior; on the coast. (17) Why is there little manufacturing? (18) What kinds are there?

Suggestions. — (19) Find out why coffee raising requires special care. (20) Find an article of furniture made of mahogany. (21) Walk toward Mexico City. (22) What reason can you give for its location? (23) Compared with water routes, are railways more or less important in Mexico than in the United States? Why? (24) Collect pictures of Mexican scenes. (25) Find some one who has been in Mexico, and have him tell you about it. (26) Who is the President of Mexico? (27) Make a sketch map of Mexico.

Central America: Questions. — (28) Name the five nations in Central America. (29) To whom does Belize belong? (30) What about the earthquakes in Central America? (31) Describe the climate. (32) Locate the leading cities. (33) What products of Mexico are also found in Central America?

(34) On the map locate the canal that has been begun across the Isthmus of Panama. (35) Where is it proposed to start another? Give reasons in favor of each.

SUGGESTIONS. — (36) What disadvantages do you see in the lack of a central government for all the Central American republics? (37) In what other ways besides saving coal would a canal there prove of advantage? Let a committee be appointed from your class to obtain definite facts about the matter. (38) Why would harbors at each end of the canal be necessary? (39) Make a sketch map of Central America.

The West Indies: QUESTIONS. — (40) Into what groups are the islands divided? (41) Tell about their climate. (42) What can you say about Jamaica? (43) What two republics on the island of Haiti? Name their capitals. (44) What are its products? (45) How have most of the Lesser Antilles been formed? (46) What is their principal product? (47) How have the Bahama Islands been built? (48) Name some of the products of the islands.

SUGGESTION. — (49) How does each of the four largest islands compare in area and population with New York State? (See tables in Appendix, pp. i and iii.)

The Bermudas. — (50) For what are they important?

For REFERENCES, see *Teacher's Book*.

FIG. P.

Rebuilding San Francisco. February, 1908. Looking west from Rincon Hill, San Francisco.

XIII. REVIEW OF NORTH AMERICA

Physical Geography. — The natural advantages that North America possesses as a home for man have been the result of slow changes extending through millions of years. How have the mountains been

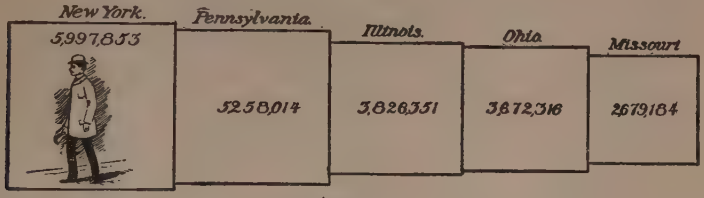
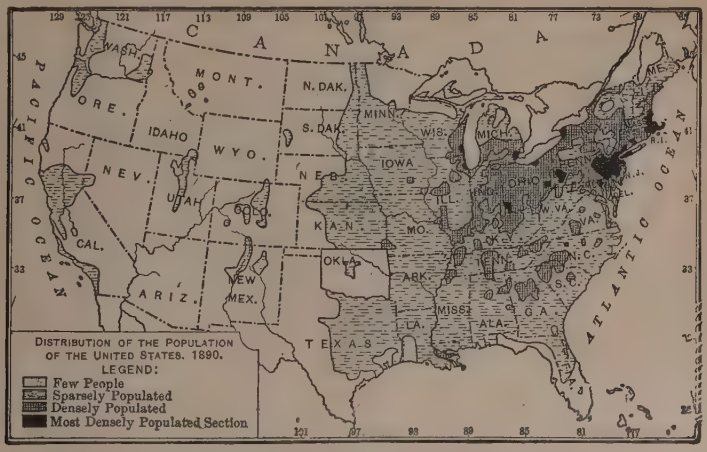


FIG. 206.

The five states having the greatest population in 1900. In this and all the other similar figures the relative importance of the states is indicated by the area of the squares.

brought into existence? (p. 2) and where are the principal chains? How was coal formed? (p. 2.) What portion of the continent was covered by the glacier? (Fig. 9.) What work of advantage to us did it accomplish? (pp. 11–15.) In what ways is the more recent rising or sinking of the coast of importance? (p. 16.)



207.

How do the animals and plants of North America vary? (pp. 20–29.) Describe the manner of life among the Eskimos (p. 30); among the Indians (p. 31). What European nations endeavored to

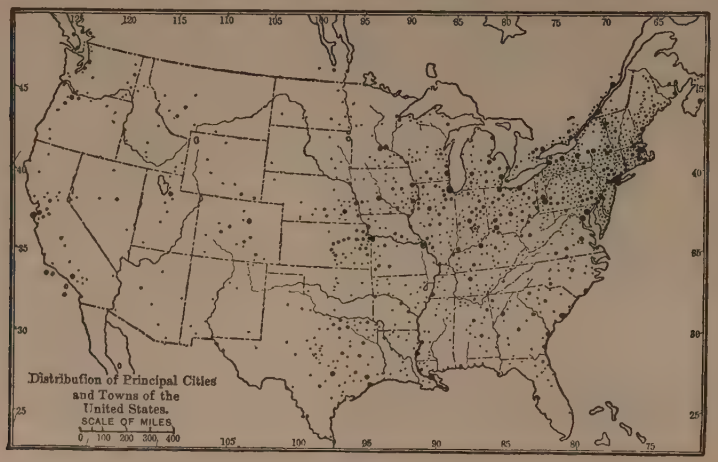


FIG. 208.

The star shows the center of population of the United States.

obtain possession of large sections of this continent? (pp. **33–34.**) Give some reasons why the English succeeded most fully (pp. 34–37).

Population. — At the present time there are probably more than a hundred million people living in North America, distributed among

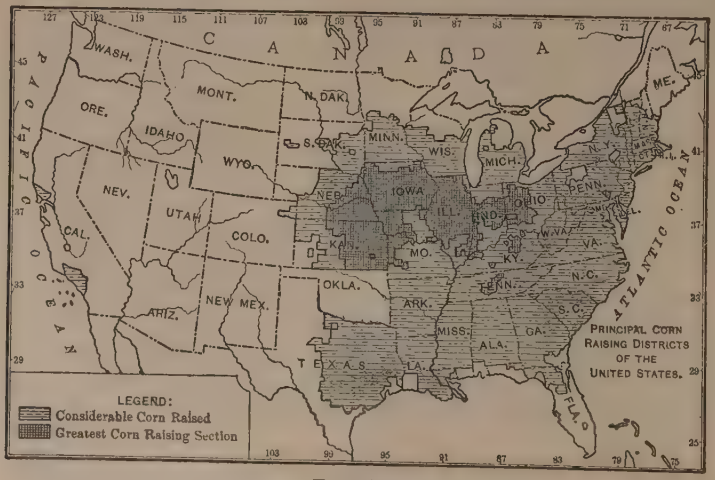


FIG. 209.

On these maps the spaces left blank indicate either little or no production.

the four greater sections as follows: Central America, over four millions; Canada, fully six millions; Mexico, over thirteen millions; and the United States (not including dependencies), more than

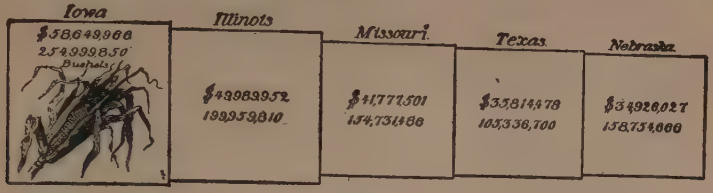


FIG. 210.

Corn production, in dollars and in bushels, in the five leading corn-producing states.

eighty-four millions. From these figures it is evident that about three fourths of all the inhabitants of the continent are living in the United States. Figure 207 shows the density of population in the different parts of the Union. (See also Fig. 39.) Where is the most thickly settled quarter? Why? The most sparsely settled? Figure 208 gives the location of the cities, the largest having the largest dots. In the Appendix (p. iv) is a table of the largest cities. Find the dot (Fig. 208) that represents each large city and give its population. In what respect are these two figures (207 and 208) alike?

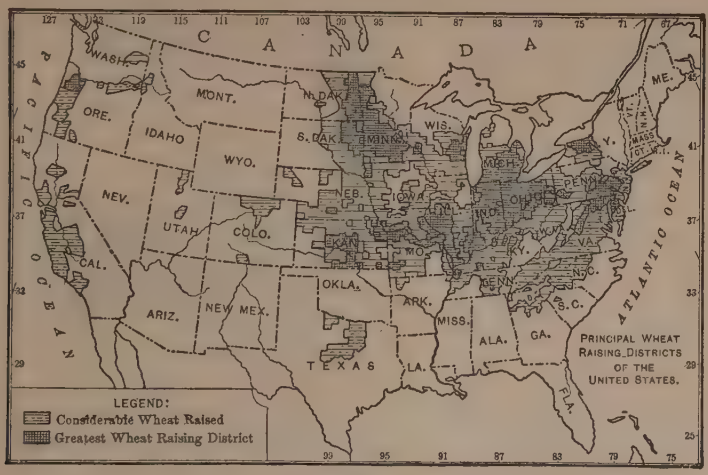


FIG. 211.

City and Country. — The great cities are so numerous, and are so often mentioned, that there is danger of overestimating their importance as compared with the country. At the time of George Wash-

ington very few people lived in cities. Even at the present time about two thirds of our eighty-four million inhabitants live either in the country, or in towns with a population of less than eight thousand. In Mexico and Canada the proportion living in cities is still smaller. In other words, the great majority of persons in North America are country people.

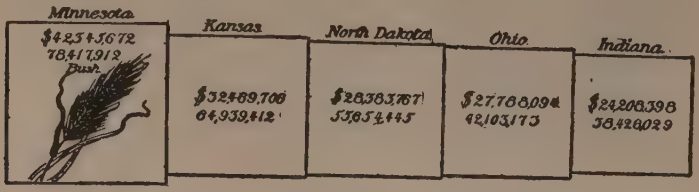


FIG. 212.

Wheat production, in dollars and bushels, in the five leading wheat-producing states.

Country. — The leading occupations of those living outside of the cities have already been studied. AGRICULTURE is the most important of all. At the present time there are over five million families occupying farms in the United States. About how many persons does that represent? Why should so many people live on farms?

Figure 209 shows the regions that are extensively engaged in raising corn. What states are included? In 1898 nearly two billion bushels were produced; how many is that to each of our inhabitants? How is corn cultivated, and what are its uses? (p. 124.)

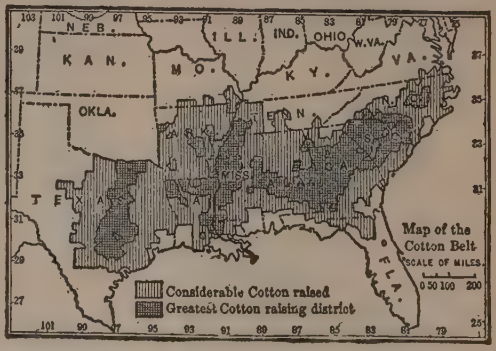


FIG. 213.

Many of the states that raise corn are also extensively engaged in the wheat industry. Figure 211 shows the wheat regions. Tell about wheat in the valley of the Red River of the North, and about the Dalrymple farm in particular (p. 125). Wheat and corn are our most valuable food crops. What other grains can you mention, and for what is each used?

The cotton belt is confined entirely to the south-eastern portion

of the country, as shown in Figure 213. Why? Name the principal cotton-raising states. Tell about the growth and uses of cotton

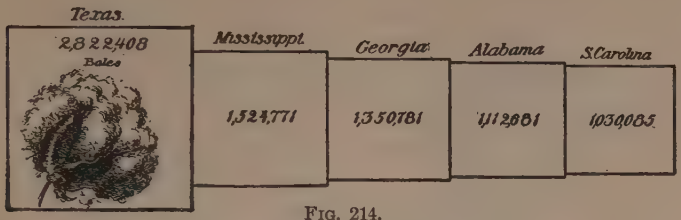


FIG. 214.

Five principal cotton-producing states.

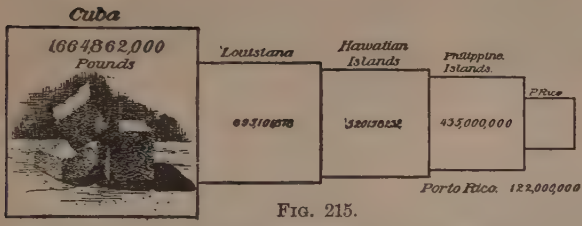


FIG. 215.

Principal sugar-producing districts in the United States and its dependencies

(p. 102). Where in these states are sugar and rice grown? How is the work carried on? (p. 104.) In what sections of California are sugar beets grown and sugar manufactured? (p. 161.) Why is sugar cane not raised in California? How does sugar beet differ from the sugar cane in growth and appearance?

A large sugar-refining plant is located at Port Costa, California.

From where does this refinery receive its raw sugar? Why is it located at Port Costa?

According to Figure 216 what states are largely engaged in tobacco growing? What is the appearance of the plant, and how is it prepared for use? (p. 74.)

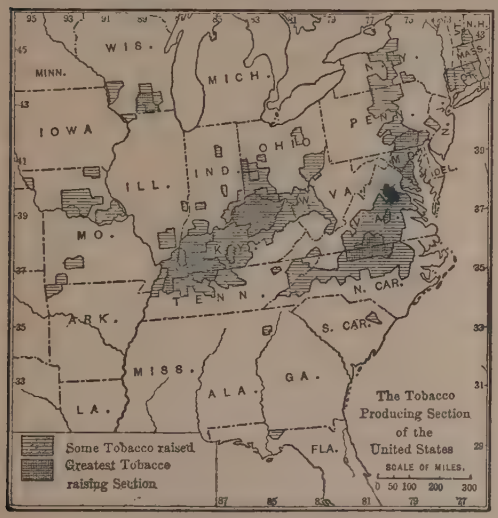


FIG. 216.

Following are three figures showing the principal states from which some of the other important farm products come.

Hay production, in dollars and tons, in the five principal hay-producing states. For what is hay used?

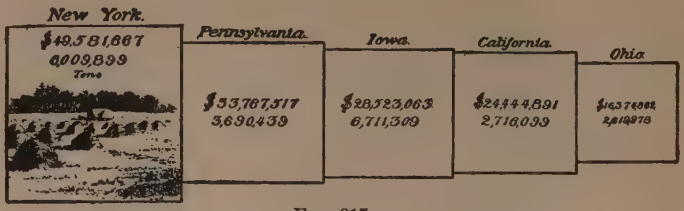


FIG. 217.

Number of hogs and their value in the five principal states.

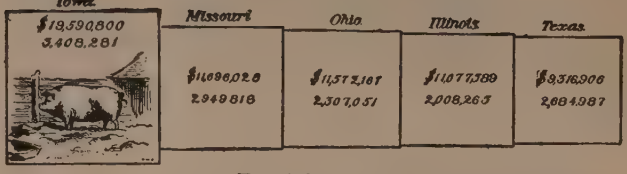


FIG. 218.

Five principal milk-producing states.

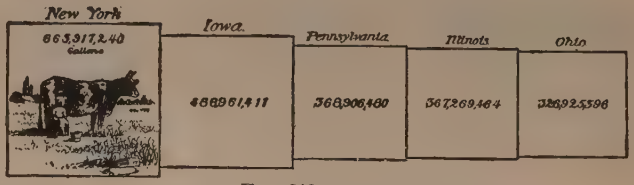


FIG. 219.

MINING is a second industry which confines people largely to small towns and to the country. About four hundred thousand men are employed at it. How many different metals can you name?

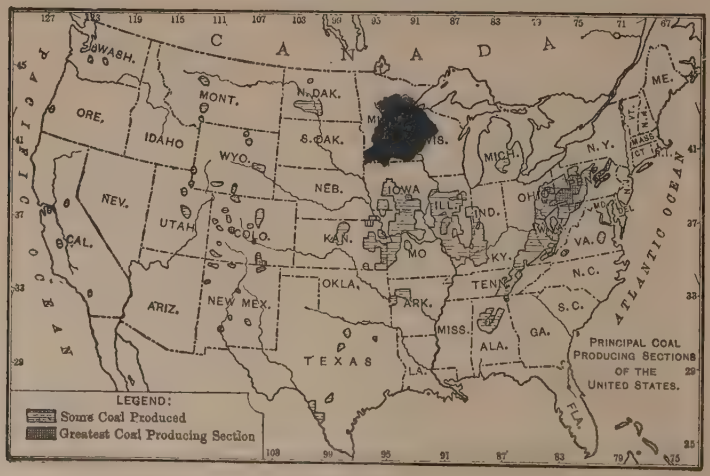


FIG. 220.

How many other products can you mention that are obtained from underground?

Of them all, the *fuels* are probably the most valuable. Why? What kinds are there? Figure 220 shows how extensive the *coal beds* are. Name the states in which the greatest quantities of coal are mined. Of what importance is it that there are coal fields in so many parts of the country? What kinds of coal are there? And what are the differences between them? (p. 4.) Describe a coal mine (pp. 77–78). What are the uses of coal?

FIG. 221.

Coal production, in dollars and tons, in the five leading coal-producing states.

Name the chief states in which petroleum and natural gas are found. Tell also how they have been produced during the past ages and what their uses are (p. 78).

The ores producing iron are among the most important of the mineral products. Why so important? Where are the principal iron-producing regions? (Fig. 223.) How is pig iron made? (p. 81.) Why is not the Lake Superior district a favorable place for smelting iron ore?

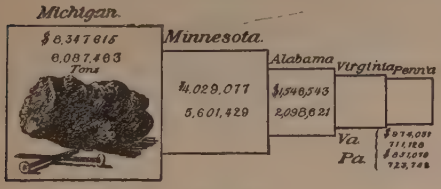


FIG. 222.

Iron-ore production, in dollars and tons, in the five leading iron-ore-producing states.

Among the metals of great importance to man are the precious metals *gold* and *silver*. Describe three methods of gold mining (p. 153). Tell about gold and silver mining in California and Colorado (pp. [illegible]54). In what other parts of our country are the precious metals found? (Figs. 224, 226.) What two sections are most noted for copper mining? (Fig. 223.) Tell about that industry in each section (pp. 134, 155). Where and how is stone quarrying carried on in New England? (pp. 53–55.) How is salt mining carried on in New York? (p. 76.)

GRAZING is a third important rural occupation. Point out on the map (Fig. 44) the portions of the country largely given up to it. Why these? Relate how cattle ranching is carried on (p. 128); also sheep ranching (p. 161). Which states are most important in these industries? (Figs. 228–230.)

LUMBERING is a fourth great industry that attracts people to the country. Figure 231 shows the distribution of the forests. Describe the industry as it is carried on in Maine (p. 51). In the Southern States (p. 101). In Michigan (p. 130). In the Northwest

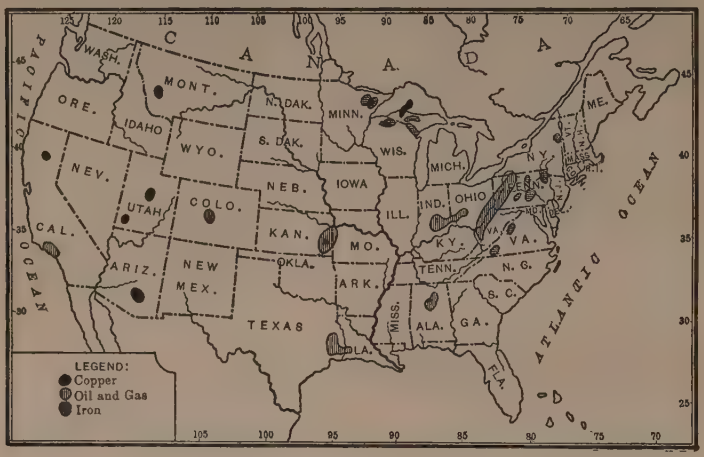


FIG. 223.

Leading iron, copper, oil, and gas producing regions.

(p. 156). Why these differences? Which are the most common kinds of trees? What are the products of the forest besides lumber? (pp. 52, 53, and 101.)

FISHING is a fifth prominent occupation outside of cities. In what sections is it especially important? Describe how cod fishing is carried on (p. 56); salmon fishing (p. 172); the oyster industry (p. 72).

Altogether, therefore, there are five industries that lead the greater part of the inhabitants of the United States to live in small towns or in the country. Name these occupations. They furnish us with the raw materials for *food*, *clothing*, and *shelter*. What raw materials enter into each, and whence does each come?

Cities. — What are the principal occupations in the cities? The answer has been repeatedly suggested. What, for instance, are the main kinds of business in Duluth? (p. 136.) In Minneapolis? (p. 141) In Chicago? (pp. 137–139.) In Buffalo? (p. 85.) In New York? (pp. 87–92.) In Baltimore? (p. 93.) In San Francisco? (p. 170.) Tell what is done in various cities with grain, ores, hides, cotton, wool, lumber, and fish.

FIG. 224.

Gold and silver producing regions indicated by crosses.

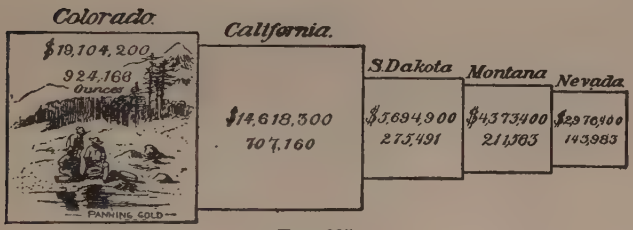


FIG. 225.

Gold production, in dollars and ounces, in the five leading gold-producing states.

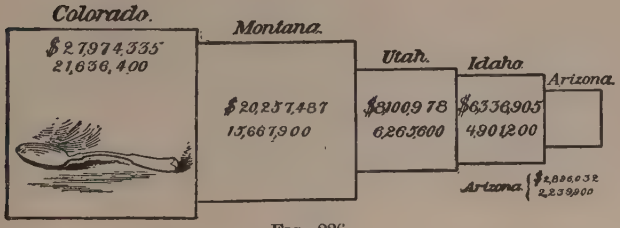


FIG. 226.

Silver production, in dollars and ounces, in the five leading silver-producing states.

FIG. Q.

Giant Grapevine — Carpinteria — California.

Pacific or 120th Mer. Time
Mountain or 105th Meridian Time
Central or 90th Meridian Time
Eastern or 75th Meridian Time
Intercol. or 60th Mer. Time
COMPARATIVE TIME WHEN NOON AT LONDON (Greenwich)
CANADA
UNITED STATES
MEXICO
GULF of MEXICO
ATLANTIC OCEAN
PACIFIC OCEAN
Transcontinental Railroads in
UNITED STATES
and adjacent portions of
NORTH AMERICA.
Transcontinental Railroads thus:
Other Railroads thus:
Standard Time Divisions thus:
Connecting Steamship Lines thus:
Scale of Miles.
0 100 200 300 400 500
NOTE:
This Map shows all Railroads in North America except the Yukon Ry. on the North and a few short Railroads in Central America.
Vancouver
Victoria
Seattle
Portland
Salem
Spokane
Helena
Billings
Bismarck
Duluth
Minneapolis
St. Paul
Winnipeg
Regina
Fort Arthur
Sault Ste. Marie
Montreal
Ottawa
Toronto
Quebec
St. John
Halifax
St. Johns
NEWFOUNDLAND
Boise City
Pocatello
Ogden
Salt Lake City
Virginia City
Carson City
Sacramento
San Francisco
Los Angeles
San Diego
Denver
Grand Jct.
Colorado Springs
Pueblo
Omaha
Council Bluffs
Chicago
Milwaukee
Detroit
Buffalo
Cleveland
Albany
Boston
New York
Philadelphia
Baltimore
Washington
Cincinnati
St. Louis
Pittsburg
Santa Fé
Albuquerque
Phœnix
Tucson
El Paso
Guthrie
Fort Smith
Little Rock
Memphis
Nashville
Charlotte
Norfolk
Richmond
Wilmington
Charleston
Fort Worth
Dallas
Vicksburg
Jackson
Montgomery
Savannah
Jacksonville
St. Augustine
Austin
Houston
Galveston
New Orleans
San Antonio
Eagle Pass
Tampa
Miami
Key West
Havana
BAHAMA ISLANDS
Nassau
Cienfuegos
CUBA
Manzanillo
Santiago de Cuba
Port au Prince
HAITI
San Juan
ST. THOMAS &
Santo Domingo
PORTO RICO
JAMAICA
Kingston
Lerdo
Tampico
Progreso
YUCATAN
Mexico
Vera Cruz
Rio Grande
Pecos R.
Red R.
Missouri R.
Columbia R.
Colorado R.
St. Lawrence R.
Mississippi R.
STEAMSHIPS TO EUROPE

FIG. 227.

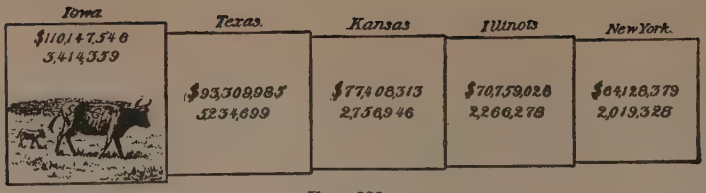


FIG. 228.

Number of cattle and their value in the five principal cattle-producing states. Many of these are kept, not on ranches, but on farms in the Eastern States.

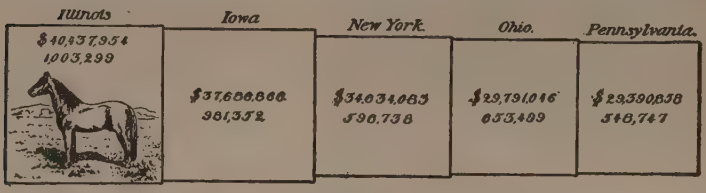


FIG. 229.

Number of horses and their value in the five principal horse-producing states.

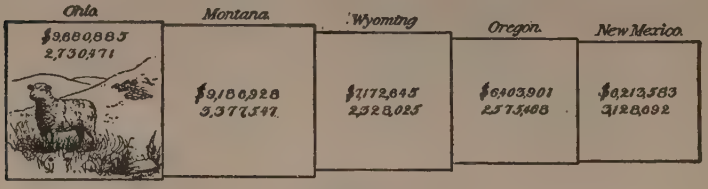


FIG. 230.

Number of sheep and their value in the five leading sheep-producing states.

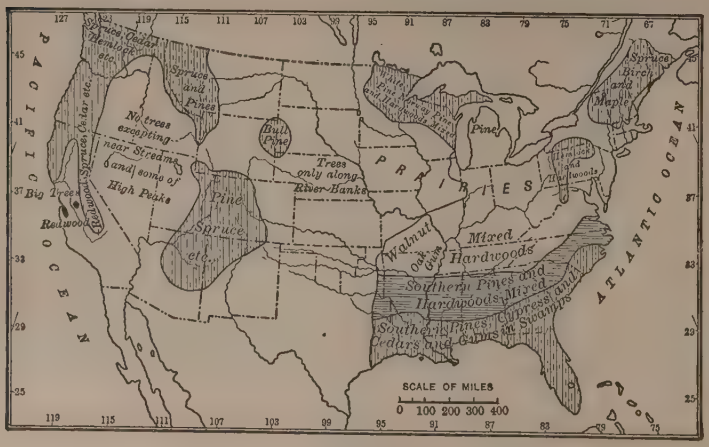


FIG. 231.

Map showing the regions from which much timber is now being obtained.

It is evident that one of the principal occupations in cities is MANUFACTURING. Where, for example, is the making of iron goods especially important? Tobacco? Sugar? Paper? Farming implements? Furniture? Freight and passenger cars? Cotton cloth? Woolen cloth? A single large factory may employ thousands of workmen (p. 62), and where hundreds of factories are established, as in New York, Chicago, and Philadelphia, there must be an enormous population. More than five million persons are engaged in manufacturing in the United States and the number is constantly increasing.

FIG. 232.

Sections where ocean fish are found.

A second great occupation in cities is that of BUYING and SELLING. Although grain, cotton, wool, etc., are produced in immense quantities in the country, they are not generally bought and sold there. That work must be carried on where there are great numbers of people; for where else could it be done so successfully? If a person living in a city should want only a bushel of potatoes, he would not go to a farmer for them, but to a store to which many other people also go to buy goods. If you were a farmer in Illinois and wanted to buy a car load of cattle to fatten, you would not go out West to a cattle ranch, but probably to the stock yards at Chicago, where many cattle are always to be found. Or if you had a quantity of cotton to dispose of, where else could you do it better than in some city where cotton is bought and sold, as in New Orleans or Memphis? Not only must there be *stores* where we can buy what we need, but there must also be *centers*, or cities, where

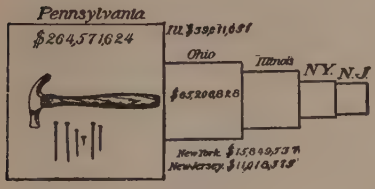


FIG. 233.

Value of iron manufacturing in the five leading iron-manufacturing states.

goods may be bought and sold on a still larger scale. A city bears much the same relation to the country round about that a store does to the people who live near enough to trade there.

Since enormous quantities of raw material must be shipped into the cities for the manufacture of goods, and since most of the finished articles are sent away, the business of SHIPPING, or TRANSPORTING, is a third great occupation in cities. Tens of thousands of men are employed in loading and unloading cars, boats, and wagons.

In this country fully four million persons are employed in commercial business, — buying, selling, and transporting goods. What raw products are taken to Detroit, and what finished products are taken away? Answer the same in regard to Milwaukee, Peoria, Louisville, Providence, Denver, and New Orleans. If your home is in the city, answer the same for that; if not, for the nearest city.

Thus there are three leading occupations in cities; namely, MANUFACTURING, TRADING, and TRANSPORTING. Every city has all three; but some that are particularly distinguished for the first are known as MANUFACTURING CENTERS; and others, distinguished especially for the second, are known as TRADE CENTERS. Minneapolis is an example of the former, and St. Paul of the latter. Give other examples of each. Those cities, like Boston, New York, Philadelphia, Baltimore, Chicago, San Francisco, and Montreal, the location of which is especially favorable for the shipment of goods, are great COMMERCIAL CENTERS, and usually also manufacturing centers. Why?

The relation between country and city is now clear. Nearly one half of our men are engaged in obtaining raw materials, and the remainder are mainly engaged in manufacturing them into useful articles, in buying, selling, and transporting them. Show by numerous examples how neither class can do well without the other.

But while they are so dependent, the life of one is very different from that of the other. Recall farm life as described on page 121. What idea have you formed of farm life on Southern plantations? Of the miner's manner of living? The ranchman's? (p. 129.) The lumberman's? (p. 51.) The fisherman's? (pp. 55–57.)

Recall, on the other hand, what was said about life in New York City (p. 88). Give your idea of factory life. Of life in trade and transportation.

What attractions and objections do you find in each of these

several occupations? Is the work of a farm hand more or less narrowing than that of a factory hand? Why? Suppose that two young men are much alike in ability, disposition, and training; how are they liable to grow unlike if one chooses mining for an occupation, and the other chooses trade? Give other instances showing how the work that one follows influences his manner of life and development.

It is difficult to determine which occupation requires the hardest work, for success demands one's best effort, no matter what the occupation may be. But of those living in the city on the one hand, and in the country on the other, which are more certain of the ordinary necessities of life? Why? Which have more comforts? Why? Which are more independent in general? Why? Which have the better opportunities for amusement? Why? For education? Why? For homes with plenty of light and fresh air? Why?

For many years the population of cities has been increasing more rapidly than that of the country, which suggests that people are preferring city to country life. Can you give any reasons for this in addition to those already mentioned?

Dependence of Different Sections upon one Another. — No one locality produces all of the materials needed there. Which of your foods are not raised near your home? How about the knives, forks, dishes, and spoons? How about the clothes that you wear?

Because of the climate, water power, soil, or for some other reason, each part of the country is especially fitted for producing one or several things, as eastern Kansas for grain, and western Kansas for stock, northern Maine for lumber, etc. Indeed, most of the articles used in each part of the country must be brought from other places. Name the materials that the Montana ranchman needs from the Southern planter; from New England; from Minneapolis and Chicago. Upon what parts of the United States are the inhabitants of Florida dependent? What do they supply in return? Make a list of the materials used in the construction of your house, and, as far as possible, determine where each one may have come from. The different parts of the country are of vital importance to one another, much as different parts of the body are.

Relation to our Territories and Dependencies. — Despite our broad territory and enormous number of products, there are some necessary articles that are either entirely lacking, or cannot be produced in sufficient quantities within our own borders. Name a few (see **table of imports, p. 524**). Mention some that we are therefore glad

to receive from Alaska, Cuba, Porto Rico, the Hawaiian Islands, and the Philippines. Mention others that they likewise are glad to receive from us. State, then, how the United States and its dependencies are of advantage to one another.

Other Countries of North America. — The principal industries in southern Canada and Newfoundland are necessarily similar to those in the northern United States. What about agriculture there? (p. 197.) Where is coal mined? (p. 199.) Precious metal? (p. 199.) What about grazing? (p. 197.) Lumbering? (p. 194.) Fishing and sealing? (pp. 195, 196.) Compare the raw products of southern Canada with those of our Northern States. Name and locate the principal cities; the leading trade route. Mention the chief kinds of manufacturing. (For above, see pp. 199–202.)

Describe the surface of Mexico (p. 206). The climate (p. 207). What are the agricultural products from its arid plateaus? (p. 209.) From its lowlands? (p. 209.) From the slopes between? (p. 209.) Tell about the forests of Mexico (p. 210). The mining (p. 210). Give some reasons why there is little manufacturing in that country (p. 212). Locate the principal cities.

Name the five republics of Central America. Describe the surface of the country and the climate (p. 213). Name the principal industries (p. 213). Tell about canals across the isthmus (p. 214). Mention the largest islands among the West Indies. What are their chief industries? (pp. 214–216.) What industries in the United States are not found in Canada? In Mexico? In Central America? What industries in any one of the latter countries are not found in the United States?

Our Relation to Other Countries. — The United States produces a far greater quantity of some materials than can be consumed at home, while other important articles must come wholly, or in part, from abroad. Give examples of each. If we could not secure a market for our products in foreign lands, we should suffer seriously; and, if the foreign countries could not be induced to provide us with what we need, we should suffer again. Other countries are in the same condition. Show how that is true of Canada; of Mexico. There is excellent reason, therefore, for a constant exchange of goods among the nations of the world. How does the size of our country give us a great advantage in this respect?

We sell more goods to Great Britain than to any other foreign land. In fact, hundreds of millions of dollars' worth of cotton,

wheat, flour, cattle, corn, meat, and oil are sent to that country every year (see table of exports, p. 524). We receive, in return, large quantities of woolen, cotton, and rubber goods, and articles made of vegetable fibers, hides, and skins (see table of imports page 524). Trade is carried on in the same manner with Germany, France, and other countries. The goods that we send forth are called *exports*, and those brought in, *imports*. Examine the tables of exports and imports on pp. 524 and 525 to see what we send away and receive, as well as the countries with which we trade.

More than half of all our exports and imports are sent by way of New York alone. Why? Other ports, next in importance, are: Boston, Baltimore, Philadelphia, New Orleans, Galveston, and San Francisco. The total value of our exports in 1907 was $1,988,989,337; of our imports, $1,591,878,298.

Some imports are permitted to enter the country free; but upon most of them there is a *duty*, that is, a charge for the privilege of entering the country. This duty is a source of income or *revenue* for the government. It is also intended to serve as a protection to home industries by preventing foreign products from being sold in our country at a lower rate than we can produce them. However, this sometimes causes great hardship. For example, a citizen of the United States, living even on the very border of Canada, cannot buy from that country such articles as lumber and wood pulp without paying a duty upon them. This causes us to pay a higher price for many articles than we would have to pay if no duty were placed upon them. Therefore, the boundary line between two neighboring countries is often of real importance as a barrier to free trade.

Transportation Routes. — The chief inland water routes for transportation of goods have often been mentioned (Fig. 238). What are they? About twice as much freight is carried over the Great Lakes as on the Mississippi system. Mention some of the principal kinds carried on each. The fact that the Great Lakes system extends so far east and west is of great importance. This route, by furnishing a cheap means of transportation to the Eastern coast, opens up a very productive region in a favorable, temperate climate. Upon reaching the coast these goods may readily be shipped to Europe, our principal foreign market.

It is largely because of these facts that most of the people of the country are living either along the northeastern coast or else from there westward to the Mississippi. On Figure 208 find the center of population in the United States.

Figures 227 and 237 show an enormous number of railways in the United States. They now carry fully three times as much freight as all the water routes together. In what part of the country are most of them found? Why there? Which quarter is next best supplied with them? Which portion has fewest lines? How does the location of lines on this figure compare with the location of cities on Figure 208? What about the *direction* of a majority of the railway lines? Count the number of railways that extend east and west across the western half of the continent (Fig. 227). In what city on the Pacific coast does each of these terminate?

Influence of Steam and Electricity. — The steam used upon the waterways and railways has been one of the most powerful factors in populating and developing our country. A century ago it required two days to travel from New York to Philadelphia, and six days from New York to Boston. In the latter case only two trips per week were made by stage. The journeys were not only very tiresome, but were also filled with hardships, and often with dangers. There were but thirteen daily papers in the United States, and neither papers nor books could be sent by mail. Letters cost from six to twenty-five cents, according to the distance, and, as the expense of carrying them was so great, they were not sent from the smaller towns until a number were collected.

Now we can travel as far in an hour as formerly in a day, and with much more convenience. There are fully two thousand daily papers, and these, as well as letters, may be sent quickly and cheaply to every section of the country. We can even send a telegraph message to a distant point in an instant, and can talk by telephone with a person hundreds of miles away, even recognizing the tones of his voice. To one of our ancestors of a century ago either one of these wonders, to which we are now so accustomed, would have seemed an utter impossibility.

Influence of Modern Inventions on Mode of Life. — The effect of such a mighty change is seen in every direction. Each year thousands of car loads of fruit are shipped to Eastern cities from California. If there were no railways, how could it reach these cities? What, then, would be the effect on southern California? Also, how could the corn of the Central States be marketed? And how could furniture, sugar, etc., be brought to the Western farmer's door? Trace other results of this change.

If we were suddenly deprived of our quick transportation, within

a few days there would be a famine in every large city. Even now, when heavy falls of snow block the trains for only a day or two, the supply of milk, meat, and other necessities quickly runs low, and the prices rise to several times their ordinary value.

If we had no railway trains, there might also be extensive famines from time to time over large areas of country, as there were in Europe in the olden times, and as there are even at present in China. Why especially in China? As it is, however, hundreds of articles of food and clothing are quickly brought from distant points at a trifling cost. Mention several such articles. No one locality is in danger of suffering from want of food, because, if the supply fails there, it is easily obtained from other sections.

The effect of steam and electricity on the industries and inhabitants of cities is striking. Persons living scores of miles away often do much of their shopping in the cities. Also, owing to trolley lines, elevated railways, and other means of rapid transit, those engaged in manufacture or commerce are enabled to live many miles distant from their places of work and thus secure more healthful homes in the suburbs. Because so many people are able to have their homes in the suburbs, the cities are not nearly so overcrowded as they otherwise would be.

Influence of our Surroundings on Education and Government. — When our Union was formed, more than a century ago, many wise persons believed it an almost impossible experiment. Our population was scattered over so many hundred miles along the Atlantic coast (Fig. 32) that people living in one part were apt to know and care little about those in another part far away. It seemed probable that quarrels and wars would arise as a result of differences of opinion, and therefore that our republican government might be dissolved into several governments.

Nevertheless our boundaries have been so enlarged as to include far more territory than was originally thought possible (Fig. 240).

Aside from that, more than twenty-three million foreigners have settled in our country since 1821, bringing to our shores all the principal races of mankind (see Appendix, p. x), and many of the leading languages, religions, and political beliefs of the world; but in spite of all this we have kept in such close touch with one another that our Union has grown stronger and stronger.

Each day, by rail and water, articles are being sent to all parts of the country. In all the states the people read the same news every

morning, and whatever books are found especially valuable in one section are quickly made known in others. Thus we not only enjoy far better opportunities for education than formerly, but we learn to *know* one another; we have the same thoughts, and we feel a mutual sympathy. So far as meeting and understanding one another are concerned, our country is really far smaller than it was a hundred years ago; we are living together like one very large family.

It has been a difficult task to convert people from so many quarters of the globe to one common product, called *Americans*, who believe heartily in our republican government (p. 37). But the attempt has not been a failure. Many have gone to the farms, where they have helped to supply the raw products; others have gone to the mining regions; but great numbers have settled in the cities, where they are chiefly engaged in work connected with manufacturing and commerce. Some are densely ignorant; but the great majority steadily improve in condition, adopt the American customs and ideas, and become good citizens.

FIG. R.

Ostrich Farm, San José, California.

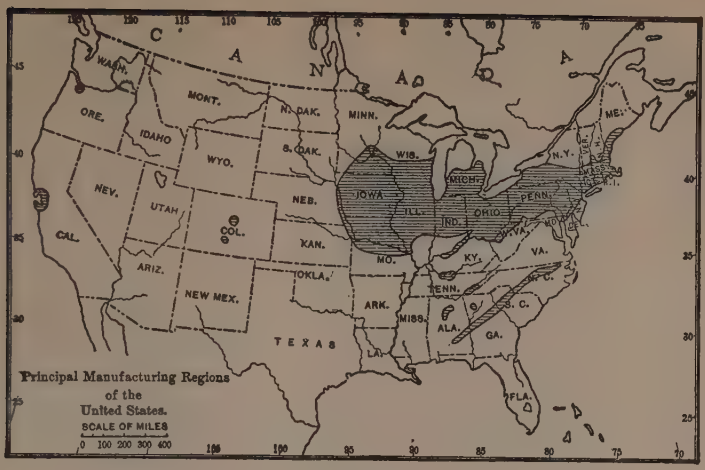


FIG. 234.

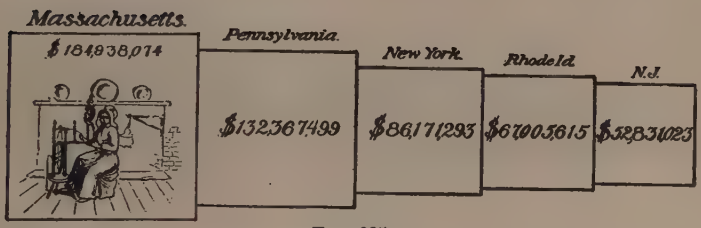


FIG. 235.

Value of the manufacture of textiles (cotton, wool, etc.) in the five leading textile manufacturing states.

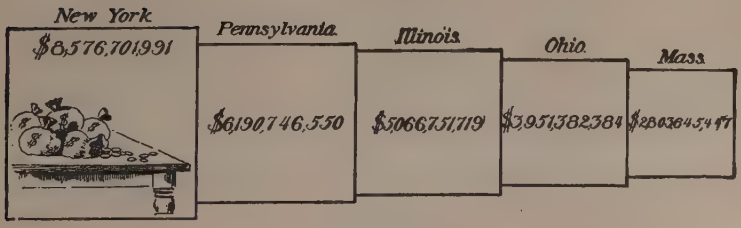


FIG. 236.

Wealth in dollars of the five wealthiest states.

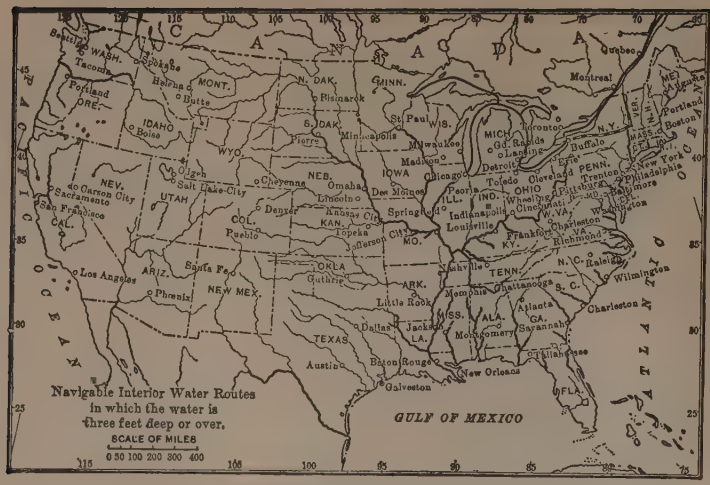


FIG. 238.

Navigable rivers represented by heavy lines.

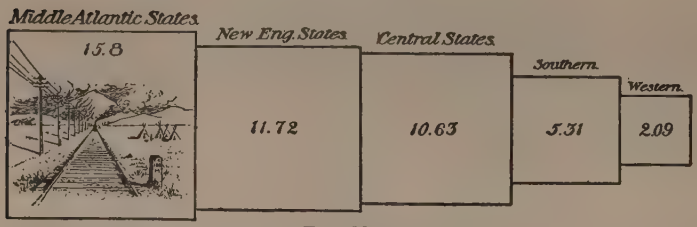


FIG. 239.

The figures represent the number of miles of railway for every one hundred square miles of territory in each of the five groups of states.

Oregon Territory Acquired by Discovery Settlement and Treaty
Louisiana Purchase From France 1803
Ceded by Mexico 1848
Gadsden Purchase 1853
Texas Annexed 1845
Territory of Original Thirteen States 1783
Florida 1819
MEXICO
SCALE OF MILES
0 100 200 300 400

FIG. 240.

Map to show when and how the United States obtained its territory.

Part II

GENERAL GEOGRAPHY

I. THE EARTH'S MOVEMENTS

Form and Size. — The earth is a sphere having a circumference of about twenty-five thousand miles, and a diameter of nearly eight thousand miles. It is slightly flattened at the poles, however, so that the line extending through the center, from pole to pole, — called the earth's *axis*, — is a little shorter than that extending in the opposite direction at the equator.

The earth is known to be round, not only because people have traveled around it, but also because its shadow, as seen in an eclipse, is always round. Show how it is true that a sphere is the only body that will always cast a round shadow. Give another proof of the spherical form of the earth.

Daily Motion. — The earth is rapidly rotating, that is, turning on one of its diameters, called the *axis*. When we glance out of the window of a moving car, the objects we pass appear to be moving in the direction opposite to that in which we are traveling. It seems as though we were standing still. In a similar way the rotation of the earth makes the sun *appear* to rise and set, and for a long time people believed that it was the sun that moved, and not the earth.

In what direction must the earth rotate, since the sun appears to move from east to west? The period of time required for one rotation is called a *day*. Since the circumference of the earth at the equator is about twenty-five thousand miles, how far does a point on the equator move in an hour? In a minute?

By rotating a globe or an apple in the sunlight show how day and night are caused on the earth. Hold the sphere still; what would be true on opposite sides of the earth if it did not rotate at all? What might be the effect upon life on the earth if the same side were always toward the sun?

Yearly Motion. — There are other variations of our light and heat besides those due to the earth's rotation. For instance, if we could spend a summer with the Eskimos in Alaska we should find weeks of constant day,[1] and be able to see at midnight (Fig. T) as well as at midday. Late in the summer, the sun begins to set, and finally it fails to appear even at noon. Then it becomes bitterly cold (Fig. 241).

FIG. 241.

Some of the Eskimos whose homes are in the frigid north. The mothers carry the babies in fur hoods on their backs.

On the other hand, in Central America the sun reappears every morning in the year; and every noon it is almost directly overhead, while for a part of the year it is exactly overhead. No snow and ice are seen, and the climate is so warm, even during the winter, that the inhabitants wear as few clothes as possible. Indeed, some savages in such hot countries wear almost none (Fig. 242).

Even where each of us lives, the period of daylight and the temperature are changing from week to week. Describe these changes as you yourself have observed them.

The causes of these changes are indicated in Fig. 243. There the earth is represented on September 23 as receiving sunlight from pole to pole. On December 21 the north pole is shrouded in darkness, while the south pole (which is shut off from our view in the figure) is within the light. On March 21 the sunlight again extends from pole to pole; and on June 21 the north pole

FIG. 242.

Savages whose homes are in the tropical zone. Contrast their dress with that of the Eskimos (Fig. 241).

[1] Exactly at the north pole there are six months of day and six months of night.

lies fully in the light, while the south pole is in darkness. In other words, the earth has a yearly motion around the sun, — called its *revolution*, — and it is the various positions that it takes with reference to the sun, while on this journey, that cause our changing length of day and our seasons.

Although the sun is ninety-three million miles from us, the earth is moving at such a tremendous rate that it completes one journey around the sun, or one *revolution*, in almost exactly 365 days. This explains how we get our year. The almost circular path that the earth follows in this revolution is called its *orbit*.

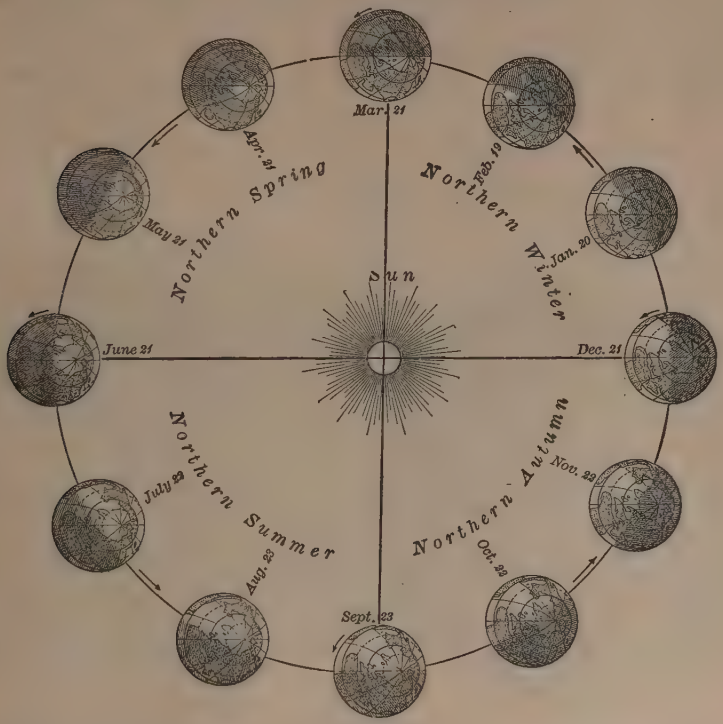


FIG. 243.

To illustrate the revolution of the earth around the sun. The shaded portion represents night. The end of the axis around which the earth rotates is the point where the lines come together (the north pole). At what date is this pole turned toward the sun? Away from it? Neither towards nor away from it? What portions of the earth do the sun's rays reach at each of these times?

The Attraction of Gravitation. — In its revolution the earth is moving at the rate of more than one and a half million miles per day. What speed! And at the same time it is whirling or rotating rapidly on its axis, as already explained (see Primary Book, p. 116).

As in the case of the earth's rotation, one might ask (Primary Book, p. 115), Why are we not swept from the earth by the wind? The answer, as before, is that the air, and everything else upon the earth, is drawn toward it and held in place by the force of gravity, so that all travel together in the journey around the sun.

If the earth is revolving at such a fearful speed, why does not the earth itself fly away into space? As a stone swinging round at the end of a string flies off when the string breaks, so it might seem that the earth would fly away, since there *appears* to be nothing holding it to the sun.

But there *is* something to hold it. It is not a string nor a rope, to be sure, but something far stronger. The sun is very much larger than the earth, in fact, over a million times as large, and attracts the earth to it, as the force of gravity attracts men and houses to the earth. This *attraction of gravitation*, which the sun exerts upon the earth, is what prevents the latter from flying far off into space; it holds the earth as firmly as the string holds the stone.

Length of Day and Night; the Seasons. — On September 23 the sun's rays are vertical at the equator (Fig. 243), *i.e.* directly over the heads of the people living along that line. Then the days and nights are equal over all the earth. This time is called the *autumnal equinox* (the latter from two words meaning *equal* and *night*).

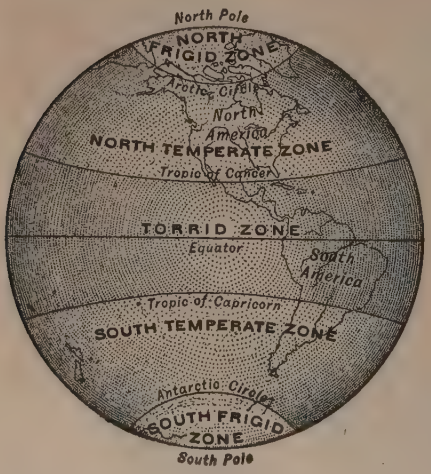


FIG. 244.

A map of the zones. Make a drawing similar to this.

On December 21 the sun's rays are vertical at the *Tropic of Capricorn*, and all the region included in the Antarctic Circle is within the light. That is the date for the beginning of winter in our hemisphere and for our shortest day. After that, on March 21, the sun's rays are again vertical at the equator. This time, called the *vernal equinox*, is the beginning of our spring. Then our days gradually lengthen until June 21, when the sun's rays are vertical over the Tropic of Cancer and light up all the region within the Arctic Circle. That is the beginning of our summer.

The Zones. — The sun gives heat as well as light, and the direction of its rays determines the boundaries of the zones. In Fig. 244

the Torrid Zone marks that portion of the earth's surface over which the sun's rays are vertical at some time in every year. On that account it is very hot there. The north frigid and south frigid zones mark the areas about the poles that lie entirely in the light at one period and in the dark at another. But the sun's rays are always very slanting there, so that the temperature is always cold.

Show the boundaries of the temperate zones, and explain why these zones are called temperate.

REVIEW QUESTIONS. — (1) What is the earth's axis? (2) What was formerly believed about the earth's movement? (3) In what direction does the earth rotate? (4) Tell about variations of light and heat, (*a*) among the Eskimos, (*b*) in Central America, (*c*) at your home. (5) What other motion besides rotation has the earth? (6) What determines the length of our year? (7) Why do we not notice the rapid movement of the earth? (8) What prevents the earth from flying off into space? (9) Tell about the direction of the sun's rays. (10) On December 21. (11) March 21. (12) June 21. (13) Name the zones, and give reasons for their boundaries.

FIG. T.

Sunset at Sitka, Alaska, 11.30 P.M.

II. WINDS AND RAIN

Winds

Review. — Our previous study of geography has shown that very regular winds blow over a considerable part of North America. For example, the West Indies, Central America, and southern Mexico receive their winds generally from the *northeast*, while on

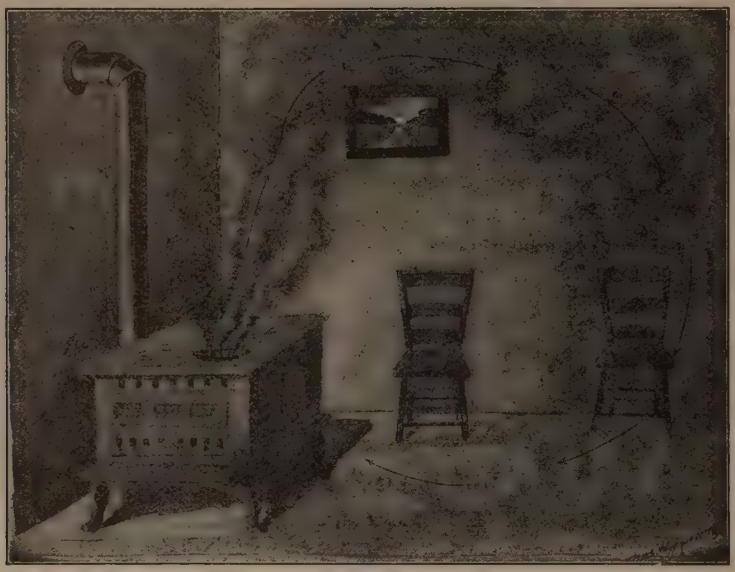


Fig. 245.

To illustrate how the air moves in a room heated by a stove.

the western side of the continent, all the way from San Francisco to Alaska, they blow quite regularly from a *westerly quarter*. On the other hand, in the eastern part of the United States, the winds are irregular in direction, although prevailing from the west. Let us examine into the causes of these movements of the atmosphere.

Effect of a Stove. — As a beginning of the inquiry, we will consider the currents of air produced by a hot stove in a room (Fig. 245). As the air near the stove is warmed, it expands and

grows lighter. Then the cooler air settles down and flows in, forcing upward that which has been warmed. The latter grows cooler in contact with the cool ceiling and walls of the room; and, being made denser and heavier on that account, it again settles toward the floor and then once more moves toward the stove. In such a room you can easily observe how much warmer the air is near the ceiling, where it has risen from the stove, than near the floor at some distance from the stove.

Winds of the Earth. — The greater winds of the earth may be compared to this movement of air in a room, the torrid zone, warmed by the sun's rays, taking the place of the stove. There, owing to the torrid heat, the atmosphere becomes expanded and light. The heavier air to the north and south flows in, pushing the light air away and producing winds, known as the *trade winds* (Fig. 246), which begin in the temperate zones, hundreds of miles away. Since the heated air must escape somewhere, it rises far above the surface, and then moves back in the same direction from which it came, forming the return trades or *anti-trade winds* (Fig. 246). The atmosphere extends many miles above the earth, so that there is plenty of room for two winds blowing in opposite directions, one above the other.

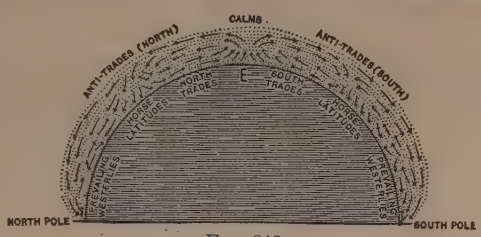


FIG. 246.
Diagram to show, by arrows, the movement of the greater winds of the earth.

In Cuba, the Caribbean Sea, and elsewhere, where the trade winds at the surface are blowing toward the southwest, one notices that the clouds far up in the sky are steadily borne in the opposite direction by the anti-trades. Also, when volcanoes in Central America have been in eruption, the ashes that were blown out from them have been carried hundreds of miles in a direction opposite to that of the prevailing trade winds at the surface.

Being cooled on account of its great height, the air of the anti-trades slowly settles, some of it coming to the surface at about a third of the distance to the poles. There it spreads out, a part continuing on toward the poles, a part returning to the equator as the trade winds (Fig. 246).

As you see, the correspondence between these currents in the

atmosphere and those in the room is quite close. In both cases air moves in toward a heated place, then up, then outward and down, and once more inward toward the heated part. Make a drawing to illustrate these *four* directions of movement of the air.

Effect of Rotation. — There are differences, however, and one of them is especially important. In the case of the room, the currents move *directly* toward the stove; then, after rising, directly away from it. If the earth stood perfectly still, the trade winds would doubtless blow directly toward the equator from the north and south and the others directly away from it.

The daily rotation of the earth, from west to east, greatly interferes with that movement. Because of rotation, the trade winds are turned, or *deflected*, from their straight course toward the equator. Those in the northern hemisphere are turned to their right, so that they come from the *northeast;* and those in the southern hemisphere are turned toward their left, and therefore come from the *southeast.*

The direction of the anti-trades is also changed toward the right in the northern hemisphere, where they blow from the southwest, and toward the left in the southern hemisphere, where they blow from the northwest. Thus the anti-trades blow over the same route as the trade winds, but in the opposite direction. We can only state the facts here, for the explanation is far too difficult to give.

Wind Belts. — Now we see why the West Indies, Central America, and southern Mexico receive such regular winds from the northeast, for they lie in the range of the trade winds just described. The prevailing west winds of the Pacific coast are a part of the air of the anti-trades that has settled to the surface and is moving on in a great whirl around the poles. This region is known as the belt of *prevailing westerlies*, because the air moves so steadily from a westerly quarter.

If you watch the higher clouds you will find, in most parts of the United States, that they are moving from the west toward the east; and the winds at the surface are also more often from the west than from any other quarter. This section, including northern United States and Canada, in which the prevailing winds are so nearly from the west, is known as the region of *prevailing westerlies.*

What has been said about the winds of North America applies, with some exceptions, to other parts of the world; in other words, there are several belts of regular winds extending around the earth. Figure 249 shows these very clearly. Point out the belt of *trade winds* north of the equator. Point out the *prevailing westerlies.* Point out the two corresponding belts of wind on the south side of

the equator. Notice how much more definitely these are all shown over the ocean than over the land.

Winds are much more steady on the ocean than on the land for several reasons, the principal one being that the temperature of the water does not change so quickly as that of the land. On land one place may become much warmer than another not far away, and then winds blow toward the warmer section. This often changes the direction of the regular winds.

So steady are the prevailing westerlies over the ocean, that, in the southern hemisphere, where there is little land, they almost always blow from the west. Indeed, it is said that vessels, choosing a course south of Africa and South America, can sail around the world with fair winds almost all the way, if they go *toward* the east; but if they sail in the opposite direction, the winds are against them.

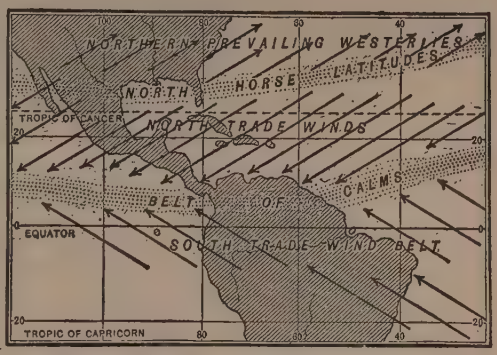


FIG. 247.

Diagram to show the position of the trade-wind belts and the belt of calms in summer. Compare with Figure 248.

All these belts of wind owe their existence to the differing temperatures of the several zones; and since the sun, which is the cause of these zones, has shone for millions of years, and will probably continue to shine for millions more, we may be certain that these great winds are *permanent winds*. The currents of air in a room cease when the stove grows cold; but, for ages to come, the sun will heat the torrid zone more than the temperate. Thus the trade winds will be kept in motion day and night, winter and summer, as they now are, and as they were when they helped Columbus on his venturesome voyage across the Atlantic.

Belt of Calms and Belt of Horse Latitudes. — Besides the four belts of winds just mentioned there are three belts of calms and light, variable winds. As the trade winds approach the central line of the heated belt, or the *heat equator*, they travel more slowly. Then, owing to expansion from heat, and to pressure from the colder air behind, the air rises over a broad area to a great height. In this belt of rising air, whatever winds are felt

are light and changeable, and calms often prevail; hence the name *belt of calms*, as shown in Figures 246 and 249. The width of this belt is several hundred miles.

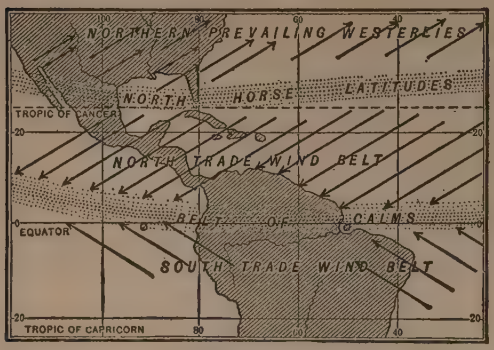


FIG. 248.

Diagram to show the position of the belt of calms and the trade winds in winter. Compare with Figure 247.

Northern Mexico and southern California are situated in another belt of light winds with frequent calms. Here, however, as stated before (p. 245), the air of the anti-trades is *settling* toward the earth, a part to return as trade winds to the belt of calms, and a part to continue onward as the prevailing westerlies. This is known as the region of the *horse latitudes*.[1] Point out the belt on Figures 246 and 249. Show the corresponding belt on the south side of the equator.

Effect of Revolution. — The belt of most intense heat is not always in exactly the same part of the earth, being north of the equator in June, when the sun is vertical at the Tropic of Cancer, and south of it in December, when the sun's rays are vertical at the Tropic of Capricorn. This causes all these belts to change their position somewhat, being farther north in our summer than in our winter (Figs. 247 and 248). The effects of this fact are very important, as we shall see (p. 254).

RAIN

Causes for Rain. — Knowing the wind belts that encircle the earth, we have a key to the principal rain belts; for winds are the water carriers of the earth. Water which is evaporated from the surface of the oceans and lands is borne along in the air. As rain or snow it descends to the earth, abundantly along most coasts, and, usually, less liberally toward the interior of the continents.

It is an important fact that there can be more water vapor in warm than in cool air. Therefore, whenever air is cooled sufficiently some of

[1] Called horse latitudes because sailing vessels, carrying horses from New England to the West Indies in the early days, were so delayed by the calms that the horses had to be thrown overboard when the drinking water gave out.

FIG. 249.

A diagram to show the principal wind belts of the earth.

FIG. 250.

A rainfall map of the world. In which of the wind belts (see Fig. 249) do we find the heaviest rainfall? On which coasts? Where are the deserts? Explain the location of those on each continent. Why should there be more desert in Africa than in South America?

the water vapor which it bears is condensed. For example, vapor condenses on an ice-water pitcher because the air next it is cooled; and dew forms on grass when the air near the ground grows cool in the evening. In a like manner the vapor in our breath forms a little cloud when the breath in winter is cooled by mixture with the cold outside air.

Rain is usually caused by the cooling of air which is rising to higher levels and therefore expanding. When you open the valve of a bicycle tire, the outrushing air expands and grows cool; and if you place your finger over the valve, you can feel the coolness. In a similar way, when air rises above the surface of the earth it expands because there is less air above to press upon it. Then it grows cool; and while doing so, some of its vapor may be condensed to form clouds and raindrops. So whenever air from the damp oceans is rising over highlands, or whenever it is being raised over warm lands by the cooler air that pushes underneath, as in the belt of calms, rainfall naturally results. Briefly, — *when air rises, it expands and cools; and then rain commonly follows.*

On the other hand, air that is settling grows warmer, and instead of giving up its vapor, it becomes dry and clear. This may again be illustrated by reference to the bicycle; for when air is pumped into the tire, the pump becomes warm as the air is compressed. In a like manner, air that is descending toward the earth's surface is compressed and warmed because of the increasing pressure of the atmosphere above. Since there can be more vapor in warm than in cool air, when air flows down the mountain slopes, or descends from high altitudes, as in the horse latitudes, clouds disappear and water is evaporated from the ground. Briefly, — *when air descends, it becomes dense and grows warmer; then the sky is clear and the weather dry.*

Rain Belts in North America. — These facts have been well illustrated in the rains of North America. The northeast trade winds, having gathered a large amount of vapor from the Atlantic Ocean, the Caribbean Sea, and Gulf of Mexico, deposit it on the windward slopes of the West Indies, southern Mexico, and Central America (Fig. 251). The southwestern slopes of these islands, however, receive a smaller quantity, and the western coast of Mexico is therefore arid. The prevailing westerlies, having traveled a long distance over the Pacific, likewise cause heavy rains along the western coast of North America (Fig. 252). But the land farther

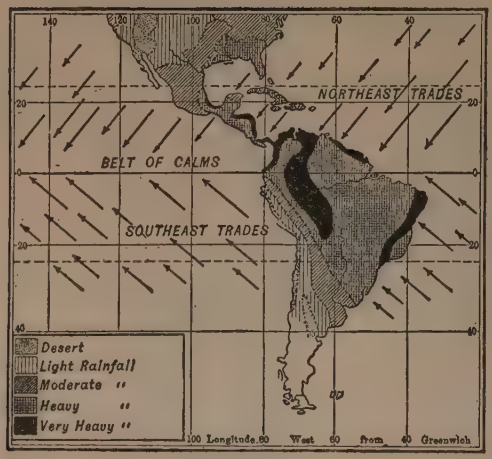


FIG. 251.

The rainy east coast and arid west coast of the trade wind belts. Also the rainy belt of calms of South America.

east grows more arid, because these winds also lose their moisture in passing over the land. Northern Mexico and southwestern United States, lying within the horse latitudes, where the air is descending, receive very little rain and are arid (Fig. 252).

Other Rainy and Arid Regions of Northern Hemisphere.—Other regions lying within these belts illustrate the same principles. For example, note (Fig. 251) what heavy rains are brought to northern South America by the northeast trade winds. The Hawaiian Islands, also lying within their range, are kept moist by them, especially on the windward side of the highlands, just as in the West Indies.

But the northeast trade winds of the Old World deposit little moisture, as is clearly shown by Figures 250 and 253. One reason is that they blow largely over land, rather than over water; it is mostly level land, too. Another very important reason is that the air is mov-

FIG. 252.

The heavy rainfall where the prevailing westerlies blow over the rising coast. What is the condition farther east? What is the case where the trade winds blow? Why?

ing from a cooler to a warmer region and is therefore not forced to give up its moisture. On the contrary, it can take more vapor and is steadily evaporating water. Thus the trade winds are drying winds on the land, and this accounts for the desert of Sahara and other deserts. Europe is affected by the *prevailing westerlies* much as western North America is. But its three southern peninsulas, like southern California, lie partly within the horse latitudes, and their southern portions are much affected by drought.

South of the Equator. — South of the equator we find the southeast trade winds causing heavy rains on the east coast of South America (Fig. 251); then proceeding across the continent, they cause other heavy rains in the neighborhood of the Andes; but parts of Peru and Chile on the western side of the mountains are left to suffer from drought although within sight of the greatest ocean in the world. Australia, lying in the same belt of winds, is similar. But this time the loftiest highlands are close to the east coast, so that nearly all the remainder of the country suffers for want of rain (Fig. 254).

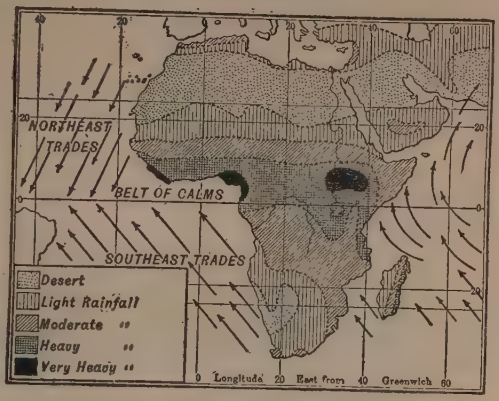


FIG. 253.

To illustrate the desert regions in the trade-wind and horse-latitude belts of Africa. Also to show the heavy rainfall in the belt of calms. Find the similar belts on Figures 251, 252, and 254.

Belt of Calms. — The belt of calms is the most rainy of all the belts (Figs. 251, 253, and 254), because its hot, moisture-laden air is rising and cooling. After a clear night in that region, the sun usually rises in a cloudless sky. As the morning advances and the heat grows more intense, the damp air rises more rapidly; then small clouds appear and grow steadily until rain falls from them. Showers occur practically every day, increasing in the afternoon. When the sun sets and the air rises less actively, the clouds melt away, the stars appear, and the night is as clear as before. Our hot, muggy summer days, with heavy thunder showers in the afternoon and evening, illustrate the weather that is repeated day after day in this belt of calms.

It is the heavy rain there that supplies the dampness necessary for the dense jungles of the tropical forest of the Amazon valley, Central Africa, and the East Indies (Fig. 250).

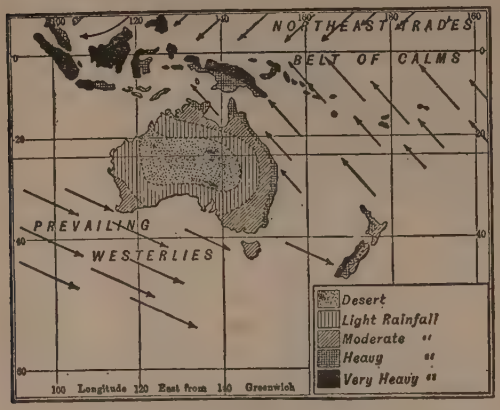


FIG. 254.

Showing the heavy rainfall on the east-facing coast of Australia where the trade winds blow. Notice also the arid interior and west coast. What is the condition in the belt of calms? What resemblance do you see to Figure 252?

Migration of Rain Belts. — The statement has been already made (p. 248) that the wind belts shift northward in summer and southward in winter. One of the most important effects of this change is upon the rainfall. In the torrid zone, for example, many places are within the belt of calms during the summer of their hemisphere, and are swept by the drying trades in their cooler months, thus dividing the year into wet and dry seasons. The part of northern Africa lying between the Sahara and the Sudan affords an instance of this (Figs. 255 and 256).

FIG. 255.

Winds and rainfall in South America and Africa from December to February.

Eastern United States and Canada. — Thus far only the regular wind and rain belts have been considered, and no explanation has been made of the condition of variable winds in our Eastern States. One might expect that the west winds, so dry after passing over

the highlands of western United States, would continue onward and cause our northeastern states to be arid also. But we know,

FIG. 256.

Winds and rainfall in South America and Africa from June to August. Compare with Figure 255 to see how the belts of heavy rain have migrated as the wind belts have shifted with the change of season.

in fact, that abundant rains fall in this section. We know, also, that there are no very regular winds over this vast area; on the contrary, both winds and temperature are quite changeable. In

FIG. 257.

Building wrecked by a cyclone (Fig. 258).

any particular locality on one day it may be warm and pleasant, with a south wind; the next day a cool, dry wind blows from the northwest; after two or three days this gives place to a cloudy sky

and rain, brought on by south or east winds; and then fair, cool weather sets in, with northwest winds again.

Let us inquire into the cause of these changes. From time to time out in the northwest there comes to be a place, or an *area*, of *low pressure* (Fig. 259); that is, an area where the air is lighter than that

FIG. 258.

Photograph of a cyclone in the upper Mississippi Valley.

over the surrounding region. The air from the surrounding country, where the pressure is greater, hurries toward the low-pressure area with a whorling motion, even from hundreds of miles away, causing winds which on the south side blow from a westerly direction, on the east side from a southerly direction, and so forth (Fig. 259). Toward

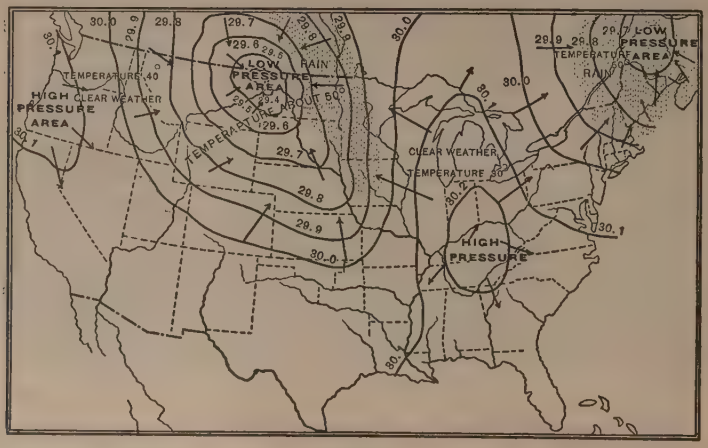


FIG. 259.

A weather map of the United States on a winter's day. The lines are lines of equal air pressure, — the lower the figure, the lighter the air (29.5 representing lighter air than 29.7). The pressure is determined by an instrument called the barometer.

the place where the pressure is low, the air is flowing in from all sides then rising. As it rises, the vapor condenses, forming clouds and rain, as in the belt of calms. Such an area of low pressure, with its clouds and rain, is known as a *cyclonic storm area;* and it is during these storms that most of the rain of the United States and Canada comes.

Instead of remaining in one place, the cyclonic storms steadily travel onward, usually beginning in the northwest and *always* passing eastward (Fig. 260). The paths followed by the storm centers generally pass over the Great Lakes, down the St. Lawrence Valley to the ocean. They move eastward because the prevailing westerlies

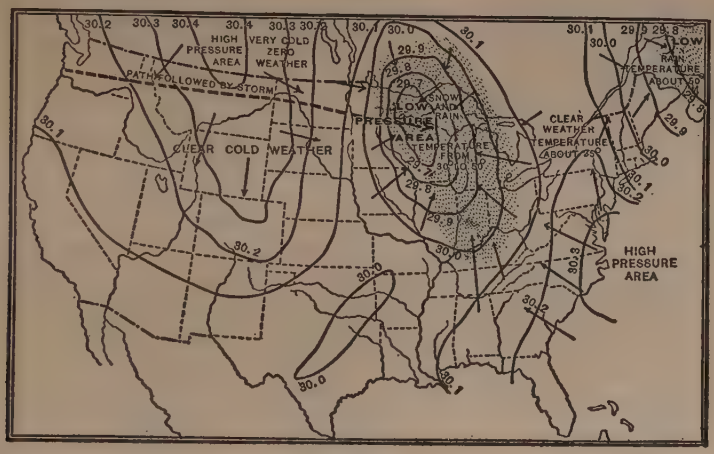


FIG. 260.

Weather map for the day following that of Figure 259. Study this carefully, and tell how it differs from Figure 259.

carry them along; indeed, these great, whirling, cyclonic storms are apparently eddies in the prevailing westerlies, similar to the eddies in the current of a stream.

The area of country upon which rain may be falling from the clouds of one of these storms is sometimes very great, places fully a thousand miles apart sometimes receiving rain at the same time. As the storm moves eastward, it grows clear on the western side, while the cloudy and rainy parts appear farther and farther eastward (Figs. 259 and 260).

The vapor is brought toward the storm center from the Gulf and the Atlantic Ocean, being carried by the winds for hundreds of miles, even into Canada. The fact that there is no high moun-

tain range extending across southern United States is of great importance. If there were such mountains, instead of the low Appalachians and the open plains of the Mississippi Valley, the winds could not carry their vapor so far, but would drop it on the coast side, leaving the interior a desert.

Not only are rains caused by these storms, but hot spells and other changes as well. Warm winds, blowing toward the low pressure areas from the south, are the cause of the winter thaws and the summer hot spells in the Eastern States. It is during these hot spells that thunder storms come; also in some places, come *tornadoes*, often called "cyclones" (Fig. 258), in which the winds blow so fiercely that houses are torn to pieces (Fig. 257).

After a low pressure area has passed eastward and the storm is over, the wind generally blows from the west. This causes cool, dry weather in summer, and cold snaps in winter. Then it is said that a *cold wave* has come; and this, sweeping over the East, and even far into the South, often does great damage to fruit trees and delicate plants.

Weather Maps. — Figure 259 shows a cyclonic storm in the northwest, the arrows indicating how the winds blow in from all sides toward the center of low pressure. Farther east is a region of high pressure. In Figure 260, the high and low pressure areas are again represented; but, since it is a day later, they have moved eastward; and the following day they would be still farther east. You see from these maps how the direction of the wind for any one locality has changed as the low pressure areas have passed over the country.

These storms are so regular, and their importance is so great, that the United States government has established a *Weather Bureau* which employs a large force of men, stationed in different parts of the country, to observe the pressure of air, direction of wind, etc., and to telegraph the facts to Washington. These observations, made at the same time at all stations, furnish information which enables men to foretell the weather. Their predictions are greatly aided by the fact that all of the storms and high pressure areas will move eastward.

Maps, similar to Figures 259 and 260, called *weather maps*, are also sent out. By the predictions of the Weather Bureau, farmers and gardeners are warned against damaging frosts, and sailors against severe storms. Especially valuable service has been rendered by the Weather Bureau in predicting the very fierce *hurricanes* that arise in the West Indies and sometimes do great damage there, as well as on our own coast. These resemble the cyclonic storms, but are much more destructive.

Cyclonic Storms in Europe. — Europe is also largely under the influence of the prevailing westerlies; and cyclonic storms often cross the ocean and reach far into Europe (Fig. 261). There, as here, the extent of the country upon which rain may be falling from the clouds of one of these storms is sometimes very great. The weather like-

wise is made changeable by these storms. That is, in any particular locality it may be warm and pleasant one day, stormy the next, then clear and cool, or cold. Similar cyclonic storms develop in the prevailing westerly belt of the southern hemisphere, where they bring changes of weather to southern South America, Australia, and the islands of the great Southern Ocean.

Sea and Land Breezes; Monsoons. — There is one other great source of disturbance of the regular wind belts of the earth and of the rain belts that are dependent upon them. This is found in the difference in temperature between land and water.

Land warms and cools much more quickly than water. The land along the seashore on a hot summer morning soon becomes warm, and the air above it is heated, as over a stove, so that it expands and grows light; but that over the water remains cool, like the sea itself. This cooler air then pushes in toward the shore; and thus a breeze from the sea, or a *sea breeze*, is created. In summer, such a breeze is frequently felt at the seashore and along the shores of large lakes, and it helps to make the temperature agreeable. At night, the land cools more rapidly than the sea; and then the cool air from the land moves out toward the sea, forming a *land breeze*.

FIG. 261.

A cyclonic storm in Europe which came from the ocean. The heavy black line shows the course followed by its center. Notice how the winds blow toward the center.

Likewise, in summer the continents as a whole become warmer than the oceans; in winter they become cooler. And in some parts of the world these differences create winds on an enormous scale. Such winds exist in Mexico and our Gulf States; but in Asia they are far more important.

The interior of that continent is so far from the ocean, that there

are naturally very great extremes of temperature. During the winter, the heavy air over the cold land settles down as drying air, and presses outward beneath the warmer air which lies over the ocean. This produces dry land winds. In summer, on the other hand, the air over the cool water crowds in, raises the hot air of the continent, and produces ocean winds and rain. This is well illustrated in the southern part of Asia. Heated by the nearly vertical rays of the sun during the northern summer, the land there becomes warmer than the ocean. Toward this heated area the cooler air from the Indian Ocean crowds in, causing ocean winds.

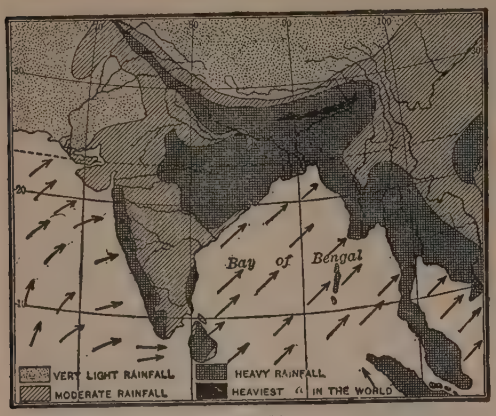


FIG. 262.

The winds and rainfall during the summer monsoon of India.

This makes the summer winds opposite in direction to those of winter, when the air from the cold lands of interior Asia is flowing out toward the warmer Indian Ocean (Fig. 263). Winds of this kind, which blow in opposite directions in different seasons, are better developed in India than in any other part of the earth, and it was there that they received the name, *monsoon* winds. The term monsoon is now applied to inward-flowing summer winds and outward-flowing winter winds of any large mass of land.

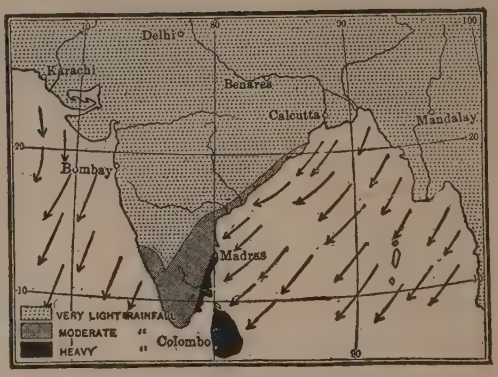


FIG. 263.

Map of the winter monsoon winds and rainfall of India. Compare with Figure 262, and notice especially how very light the rainfall is in one season and how heavy it is in the opposite season.

When the summer monsoons blow, the rainy season comes in India (Fig. 262). The rainfall is especially heavy where the moisture-laden air ascends the steep

slope of the Himalayas. In one part of this district, opposite the head of the Bay of Bengal, there is three times as much rain in July alone as falls in well-watered portions of the United States during the entire year. The winter monsoon, on the other hand, is so dry that vegetation withers and the soil becomes parched and cracked, as in a desert (Fig. 263).

While the north and south temperate zones are both called *temperate*, and have many features in common, they are quite unlike in their winds. In the northern hemisphere the broad continents become very hot in summer and cold in winter. Since the temperature of the oceans remains more uniform, the regular winds are greatly interfered with, as by the monsoons. In the south temperate zone, on the other hand, there is little land and a vast expanse of ocean. The temperature of the water changes but little, and the narrow lands have their temperature largely determined by winds from the oceans. In the south temperate zone, therefore, there is little chance for monsoons.

REVIEW QUESTIONS: (1) Tell about the directions of the regular winds of North America. (2) Describe the circulation of air in a room heated by a stove. (3) Compare this circulation of air with that in the regular winds of the earth. (4) What effect has rotation on the direction of these winds? (5) What are the names of the regular winds of North America, and over what sections of the continent do they blow? (6) Locate and describe the wind belts of the earth. (7) What proofs have we that these are permanent winds? (8) Tell about the movement of air in the belt of calms. (9) In the horse latitudes. (10) What is the effect of the earth's revolution on the location of all of these belts? (11) Tell about the causes of rain. (12) Show how the trade winds and westerlies affect the rainfall of North America. (13) What about the rainfall in northern South America and in the Hawaiian Islands? (14) How do you account for the desert of Sahara? (15) Tell about the rainfall in Europe. (16) In South America, just south of the equator, and in Australia. (17) In the belt of calms. (18) Show how the migration of the wind belts affects rainfall, and give an example. (19) Tell about the winds and rain in Eastern United States and Canada. (20) About weather maps, and the value of the Weather Bureau. (21) What about the cyclonic storms in Europe? (22) Give the cause of sea and land breezes. (23) Of monsoons. Give example. (24) Why do monsoons interfere with the regular winds much less in the southern than in the northern hemisphere?

SUGGESTIONS. — (1) Estimate the number of barrels of water that falls on an acre of ground, or upon a city block, in one year, where the rainfall is forty inches. (2) How is a movement of air secured in your schoolroom in order to ventilate it? (3) Make a drawing to show the direction of the regular winds of the world. (4) Watch the higher clouds to see in what direction they are moving. (5) Read once more the section on "Air" in the Primary Book, page 71. (6) Write an account of the change in the weather for five days in succession: — the wind direction and force; the clouds; rain; temperature; and, if possible, the air pressure. (7) Read the chapter on cyclonic storms in Tarr's First Book of Physical Geography, pp. 102–125.

For REFERENCES, see *Teacher's Book*.

III. OCEAN MOVEMENTS AND DISTRIBUTION OF TEMPERATURE

LIKE the air, the ocean water is in motion, its three principal movements being wind waves, tides, and ocean currents.

WIND WAVES

Waves are formed by winds which blow over the surface of the water and ruffle it, sometimes, during storms, causing it to rise and fall from twenty to forty feet.

In the open ocean waves are rarely very dangerous to large vessels; but upon the seashore they do great damage to vessels and even to the coast itself, wearing away the rocks and dragging the fragments out to sea. The constant beating of the waves is slowly eating the coast away.

TIDES

What the Tides are. — People living upon the seacoast are familiar with the fact that the ocean water rises for about six hours and then slowly falls. This rising and falling of the water twice each day forms what is known as the tide. For a long time men were puzzled to explain this: it was called the breathing of the earth, and by certain uncivilized races it is to this day thought to be caused by some great animal.

As a result of careful study, we have learned that the tides are caused by the moon and the sun, especially the former. Each of these bodies is pulling upon the earth, by the attraction of gravitation, as a horseshoe magnet pulls upon a piece of iron. When the sun and moon pull upon the earth, the ocean, being a liquid that can be moved, is drawn slightly out of shape. This causes two great swells, or waves, many hundreds of miles broad, to pass around the earth, following the moon. When these swells reach the shores, they cause the rise of the water known as the tide.

Height of the Tidal Wave. — The tidal wave is only two or three feet high upon headlands which project into the open ocean; but it rises a great deal higher in many bays. There the wave is raised higher because the space that it occupies becomes narrower near

the head of the bay. In some such places, as in the Bay of Fundy, the tide reaches a height of forty or fifty feet.

The height of the tide also varies from day to day, for the moon and sun, which combine to form it, do not always work together. At new moon and full moon, when the earth, moon, and sun are nearly in a straight line, the moon and sun pull together and make the tidal wave higher than at the quarter. The high range of tides at full and new moon are called *spring* tides, those at the quarters, *neap* tides.

Ocean Currents

Cause of Ocean Currents. — The winds which blow over the ocean, forming waves, also drive the water before them. You may do this in a small way by blowing on the surface of a pail of water. This starts a current, or *drift*, of surface water in the direction that the air is moving. Where the winds are steady, as in the trade wind belts, or moderately steady, as in the prevailing westerlies, there is a permanent drift of water, pushed along by the prevailing winds. These form the great system of ocean currents (Fig. 267) which have such an important influence on the earth.

In our study of North America it was several times necessary to refer to the Gulf Stream and the Labrador Current. We will now study the currents on each side of our continent more fully.

The North Atlantic Eddy. — In the eastern part of the Atlantic, where the trade winds blow, the surface water drifts slowly in the direction of the trade winds; that is, toward the belt of calms (Fig. 249). It then drifts westward, as a great *equatorial drift*, until the easternmost extremity of South America interferes with its course. There the drift of water is divided, a part being turned southward, while the greater portion proceeds northwestward.

The part that flows northward is deflected toward the right by the effect of rotation, as the winds are (p. 246); and the part that flows into the South Atlantic is turned to the left, also by the effect of rotation. Therefore the northern drift, instead of coming near to the mainland of North America, keeps turning to the right, crossing the Atlantic to Europe. It then passes southward, and finally returns to the trade wind belt where it started, having made a complete circuit. (Figs. 264 and 267.)

Coming from the equatorial region, this water is warm, and in it live countless millions of animals and floating plants. Among the latter, one of the most abundant is a seaweed, called *Sargassum*, which is thrown into

the middle of this great eddy. There it has collected until it now forms a "grassy" or "*Sargasso*" *sea*, hundreds of square miles in extent. Since the "Sargasso" Sea lies directly between Spain and the West Indies, Columbus was obliged to cross it on his first voyage of discovery; and his sailors, upon entering it, were much alarmed lest they might run aground, or become so entangled in the weed that they could not escape.

The Gulf Stream. — A portion of the drift of water which moves northward along the northern coast of South America enters the Caribbean Sea and then passes into the Gulf of Mexico. This is a broad, deep, gently-flowing current; and it is so nearly surrounded

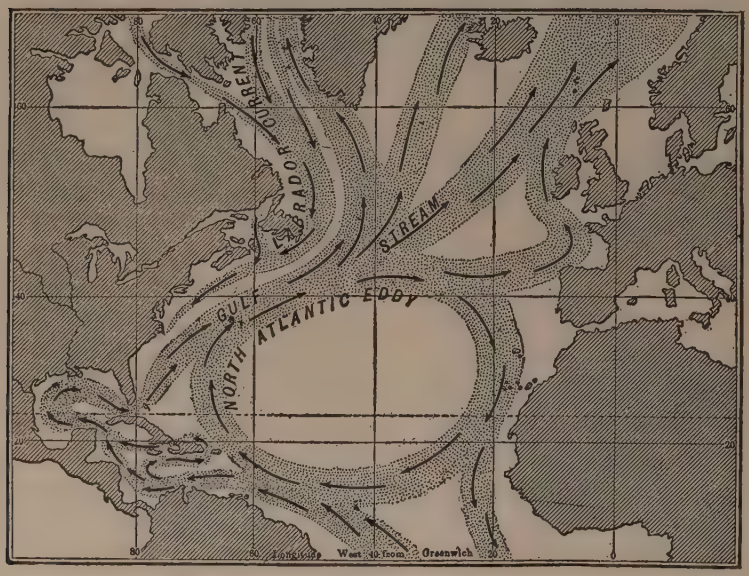


FIG. 264.

A diagram to show the currents of the North Atlantic. In order to illustrate the currents clearly it has seemed necessary to make them as if they were sharply bounded, like a river in its channel. As a matter of fact, however, the boundaries of these great currents and drifts are so indefinite that, in crossing them, one would not be able to detect the boundaries even by using the greatest care.

by the warm tropical lands that it grows even warmer than when it entered the Caribbean. After swirling round the Gulf of Mexico, it escapes between Cuba and Florida, after which it is known as the *Gulf Stream* (Fig. 264), because it comes from the *Gulf* of Mexico. Being forced to pass out through so narrow an opening, its rate of movement is much increased — even to four or five miles per hour — as water in a hose is made to increase its speed by passing through

the nozzle. Measure the distance from Key West to Havana (Fig. 163).

Being turned to the right by the effect of the earth's rotation, the Gulf Stream soon leaves the American coast and flows northeastward toward northern Europe. It broadens rapidly and joins forces with the western part of the great Atlantic eddy. In crossing the Atlantic, the drift is pushed along by the prevailing westerlies, so that it reaches the shores of northern Europe, and even enters the Arctic Ocean. Some idea of its volume may be gained from the fact that it carries many times as much water as all the rivers of the world.

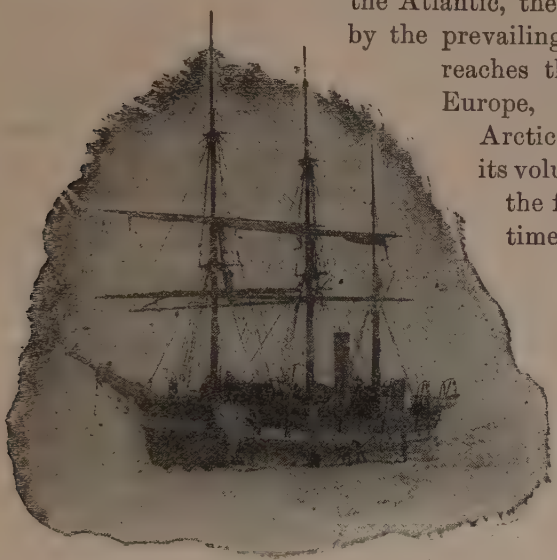


FIG. 265.

An Arctic whaling steamer imprisoned, off the coast of Baffin Land, in the floe ice which is being carried southward in the Labrador current.

The Labrador Current. — After being cooled, some of this water settles to the bottom and finds its way back to the torrid zone in the slow drift of cold water which is forever moving along the ocean bottom from the frigid zone toward the equator. But much of it returns at the surface, for there is a cold surface current, called the *Labrador current*, passing southward along our northeastern coast (Figs. 264, 265, and 267).

The Labrador current flows down from among the islands of North America, past the coast of Labrador, Newfoundland, Nova Scotia, and New England as far as Cape Cod. Like all ocean currents in the northern hemisphere, it is turned toward the right, that is, since it flows southward, toward the west. This causes it to follow our coast very closely, keeping nearer our shore than the Gulf Stream does.

Since there are two currents near together, a cold one from the north, and a warm one from the south, a vessel sailing from Boston to England must cross both. During winter storms a ship often becomes covered

with snow and ice while in the cold Labrador current, but loses this coating soon after entering the Gulf Stream.

Where the cold and warm currents come near together, a dense fog is produced. You can doubtless explain why that is so (see Primary Book, p. 77). Sailors who cross the Atlantic have learned to expect heavy fogs as they pass near the coast of Nova Scotia and Newfoundland, which is one of the foggiest regions in the world.

The Currents in the North Pacific Ocean. — In the Pacific Ocean, as in the Atlantic (Fig. 267), the water drifts westward in the belt of calms; then a broad, warm current swings to the right past Japan, crossing the ocean toward Alaska, as the Gulf Stream crosses the Atlantic toward Europe. This is called the Japanese current. Continuing to turn to the right, this great ocean drift passes southward to complete the vast eddy.

A small branch of the current turns northward along the Alaskan coast. There is also a cold current between the Japanese current and the coast of Asia, corresponding to the Labrador current in the Atlantic.

We see from what has been said, that, although the Gulf Stream flows past the Southern States, the northeastern coasts of North America and of Asia are bathed by ocean currents from the cold north. On the other hand, the northwestern coasts of Europe and North America are approached by warm drifts of water from the south.

Eddies of the Southern Oceans. — In the South Pacific, South Atlantic, and Indian oceans, the same causes have produced eddies similar to that of the North Pacific; but here the earth's rotation deflects the winds to the left, as we know, and the waters are moved in the same direction. Some of the water of these eddies joins the broad West Wind Drift of the distant southern ocean; but much of it turns northward until it once more reaches the trade wind belt, thus completing the eddies (Fig. 267).

Effects of Ocean Currents in North America: Review. — The cold Labrador current greatly affects the temperature upon the land, for winds blowing over it carry the chill far inland. This is one of the reasons why the east winds of New England are so cool, and why the New England coast is such an agreeable summer resort.

Since the Labrador current flows as far south as Cape Cod, the water north of this promontory must be cooler than that south of it. As the cold current leaves the Arctic region, it bears with it much sea ice which has been frozen during the preceding winters (Fig. 265), and also gigantic icebergs which have broken off from the Greenland glacier. It is upon

this drifting ice that the polar bear spends much of his time hunting for seals, which live in great numbers in the ice-covered waters (Fig. 266).

The icebergs may be carried southward one or two thousand miles before the air and water melt them away (see limit of icebergs on Fig. 267). Indeed, some icebergs float even as far south as the paths followed by vessels which cross the Atlantic. Since many bergs are larger than the greatest building in the world, collision with one means shipwreck; therefore sailors need to use great caution, especially when the ship is in the fog.

The cyclonic winds from the *Gulf Stream* greatly temper the climate of eastern United States, while at the same time they bring to us much vapor gathered from over these warm waters.

The warm currents of the Pacific Ocean render the southern part of Alaska far warmer than southern Labrador, which is farther

FIG. 266.

Polar bear and seal on the floe ice of the Labrador current.

south; and the prevailing westerlies bring an abundance of vapor to the Pacific coast all the way from California to Alaska. Where these winds blow, the winters are mild and the rain heavy; but the summers are cool and pleasant because the ocean water, though warm, does not become greatly heated. Notice on a globe that the state of Washington, with its pleasant climate, is about the same distance from the equator as the bleak island of Newfoundland, the shores of which are bathed by the cold Labrador current.

Effects on Other Regions. — The Gulf Stream drift is of special benefit to the Old World. It has been estimated that its waters carry one half as much heat into the Arctic as reaches it from the direct rays of the sun. When Nansen started on his famous journey toward the north pole, he entered the Arctic Ocean with this current. Thus, since its warm water keeps that part of the Arctic free from ice in summer, he was able to proceed much farther than he otherwise could have gone. Owing to this warmth, Russia is able to have a harbor on the very shores of the Arctic. Name it. Westerly winds, warmed in passing over this drift, have made possible the great civilized nations of northern Europe, the fatherland of so many Americans.

Notice on a map how many large cities are in that part of northern Europe which is the same distance from the equator as desolate Labrador. What a striking contrast these nations present to the scattered savages of the latter dreary country, whose winds come either from the land or over cold ocean water.

When our first settlers came from England they expected to find in the New World a climate like their own in the same latitude. They were unprepared for the severe winters which they actually found, and thus the first settlements on the New England and Canadian coasts were failures.

Besides thus influencing so much of the earth, the Gulf Stream, like other warm currents, has helped to form a great number of islands. Where warm currents flow, the water is often warm enough for corals to live; and, since the moving water brings to them an abundance of tiny animals for food, colonies of corals flourish, and their skeletons gradually form reefs. In this way the southern half of Florida, the Bahamas, the Bermudas, and many of the islands in the South Pacific, were built.

The cold current on the northeast coast of Asia affects that region much as the Labrador current affects northeastern North America. Its winds chill the Siberian coast, and cause the harbors, like that of Vladivostok, to be icebound in winter. This explains why Russia desired to hold the Chinese harbor at Port Arthur, south of Korea, as a terminus of the great Siberian railway, — that her commerce and warships might not be shut up in winter.

Distribution of Temperature

In general, it is true that the farther north we travel from the equator, the colder it grows; but this is by no means always the

FIG. 267.

A chart showing the principal ocean currents and ocean drifts of the world. Study this map carefully. Make a sketch map somewhat like it. Compare the direction of the currents with that of the winds in Figure 249.

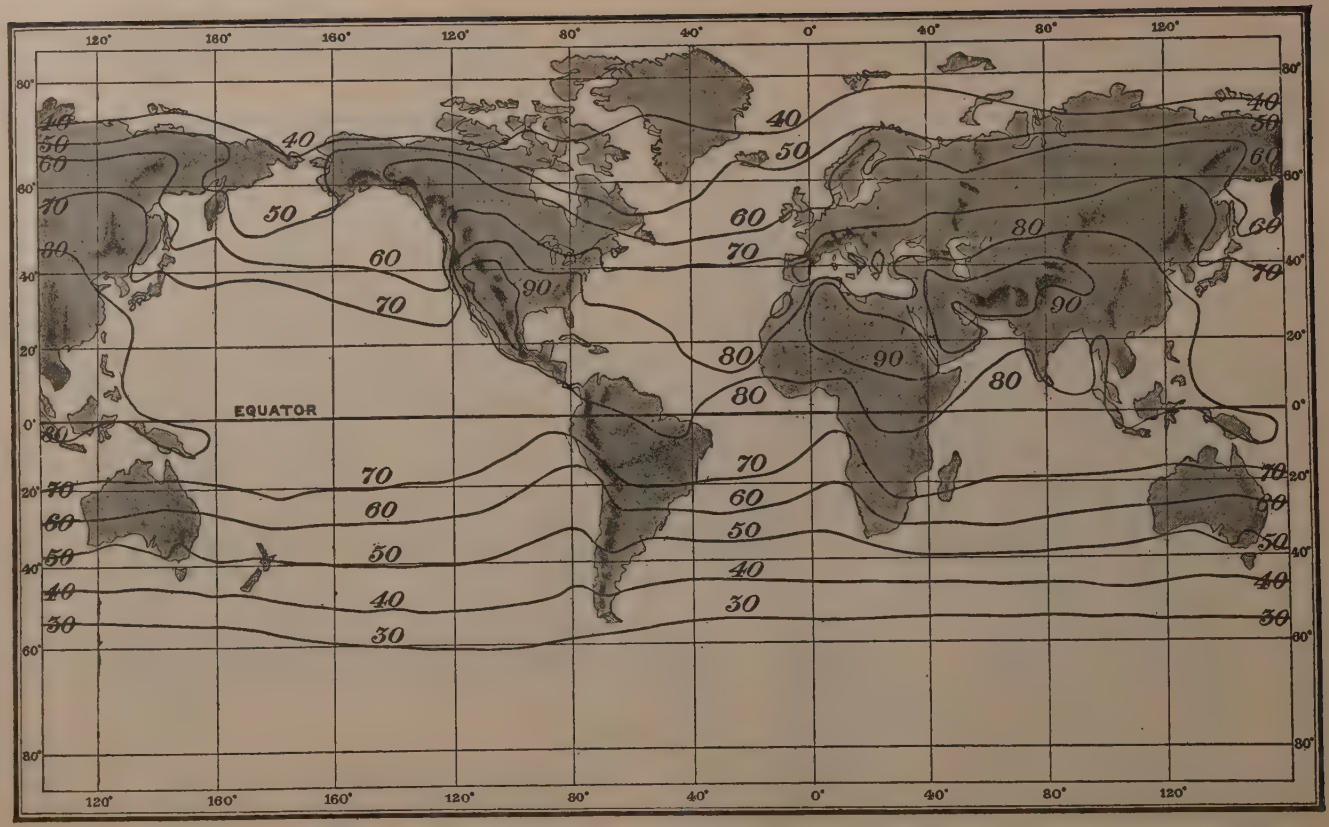


FIG. 268.

An isothermal chart of the world for July.

case. If the earth were made of one solid, level substance, like glass, the temperature *would* gradually decrease from the equator to the poles. Then all points the same distance from the equator, as all on the Tropic of Cancer, or all on the Arctic Circle, for instance, would have the same temperature.

But we have seen that there are several causes which interfere with this regular decrease in temperature toward the poles. For example, (1) high mountains have a cold climate, even though in the torrid zone; and, for the same reason, plateaus may be colder than lowlands far north of them.

Besides that, (2) land warms and cools much more rapidly than water (p. 259), so that land becomes hotter in summer and colder in winter than the ocean. Thus, in northern Minnesota, far from the coast, the average temperature in January is below zero, while in July it is about 65° (Figs. 270 and 271). In New York City, on the coast, the average in January is about 25°, and in July not quite 75°. On the west coast, in the state of Washington, where the winds are blowing from the ocean, the average temperature for January is 40°, and for July 60°.

At Key West, Florida, which is surrounded by water, the average temperature in January is about 70°, and in July about 85°. Where the temperature changes so little, the climate is said to be *equable.*

The winds (3) greatly influence the temperature. Where they blow from the ocean, they cause an equable climate, as along the coast of California; but where they blow from the land, they are cool or cold in winter and warm in summer. This is true of the Eastern States, where most of the winds blow from the land, though some of the damp winds come from the ocean.

Another cause (4) for different temperatures at places equally distant from the equator is found in the ocean currents. We have just seen that the Gulf Stream drift warms the air, while the Labrador current cools it, and thus by winds from these waters the temperature is affected over a very wide area.

If, therefore, we were to draw a line across the continent, connecting several points that have the same average temperature during any one month, or during the entire year, it would need to be a very crooked one, with some parts reaching much farther north than others. Such lines tell so much about temperature in so little space that it is the custom to make maps to show them, as in Figures 270

and 271. Since the lines connect the places having the same temperature, they are called *isothermal lines* or *isotherms.* (The first part of the word means *equal*, and the latter part *heat.*) A map or chart showing the isotherms is called an *isothermal chart* (Figs. 270 and 271). Trace several of the isotherms across the United States, and explain why they bend as they do.

Note that on the western coast the isotherms extend northward and southward almost parallel to the coast, since the prevailing westerlies bring to the land the nearly uniform temperature of the Pacific. There is only about 20° difference between winter and summer temperatures on the western coast of North America. But on the eastern coast of the United States the difference between summer and winter is much more marked, because, while some of the winds are from the ocean, still more are from the land, which is cold in winter and warm in summer.

Figures 268 and 269 show similar isotherms for the world. Observe how these bend toward the equator where they cross mountain chains. Comparing these two figures, you will notice how the winter isotherms of the north temperate zone bend *toward* the equator over the continents, for reasons given in (2) above. During the summer, on the contrary, the isotherms curve poleward. On what continent are these bends most striking? Why? Explain the effect of the Gulf Stream drift as shown in Figure 269.

The reason is evident why the isotherms of the North Atlantic are close together as they leave America, but spread apart like a fan toward the Old World. On the American side the currents approach each other, one from the north bearing Arctic cold, the other from the warm south. This causes great temperature contrasts between our northern and southern coasts. On the European side one part of the ocean drift passes northward, raising the temperature and bending the isotherms far northward. The remainder turns southward and, being somewhat cooler than the region into which it enters, slightly lowers the temperature and bends the isotherms southward. Thus the isotherms are spread apart.

REVIEW QUESTIONS: *Waves and Tides.* — (1) Of what importance are the waves? (2) How often does the tide rise and fall? (3) What causes it?

Ocean Currents. — (4) Explain how winds help to produce ocean currents. (5) Describe the drift of tropical waters in the Atlantic. (6) Trace the drift which passes outside of the West Indies to the European coast. (7) Describe the Gulf Stream. (8) Describe the Labrador current. (9) Trace the currents in the North Pacific. (10) What coasts mentioned are bathed by warm currents? By cold

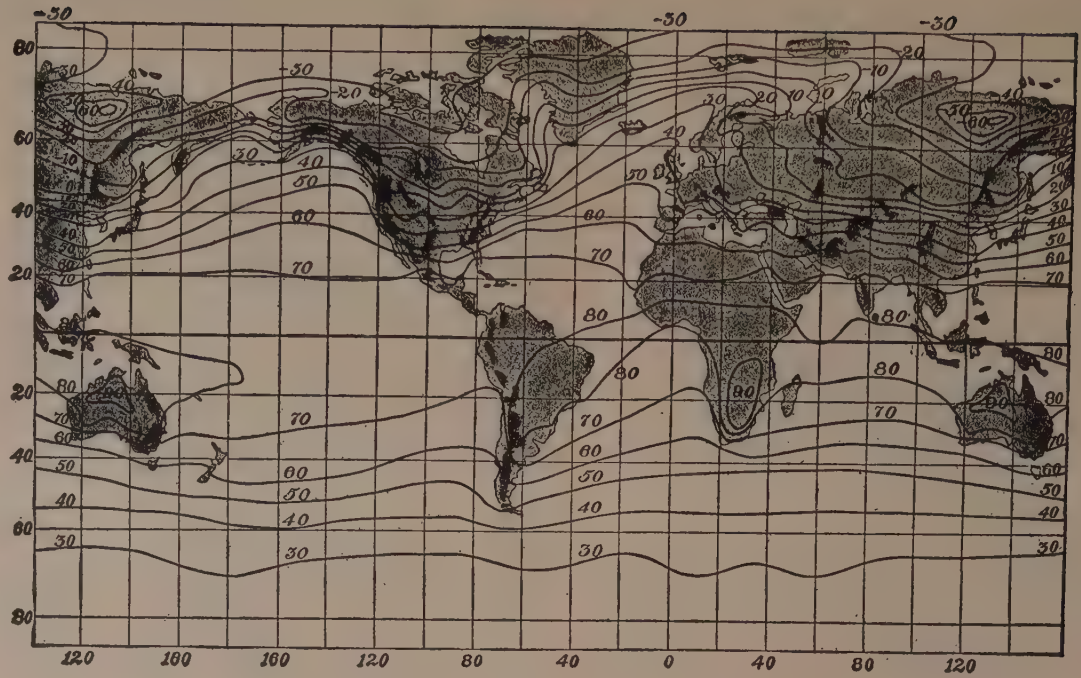


FIG. 269

An isothermal chart of the world for January.

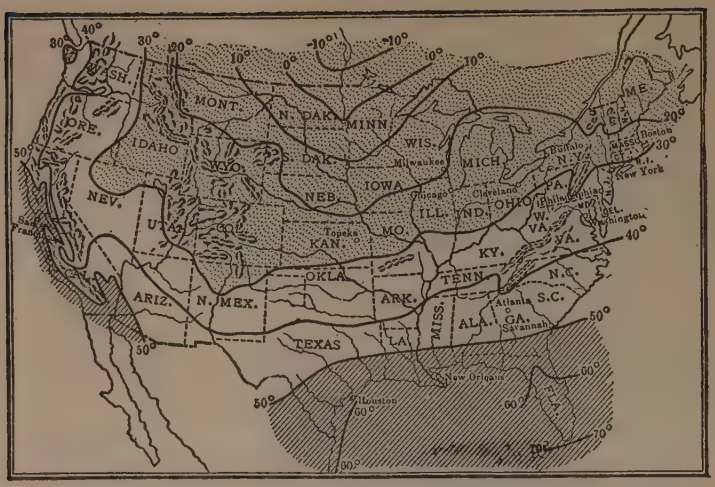


FIG. 270.

Isothermal chart of the United States for January. Why is it colder in the interior than on the east coast? Why so warm on the west coast? Can you notice any influence of mountains?

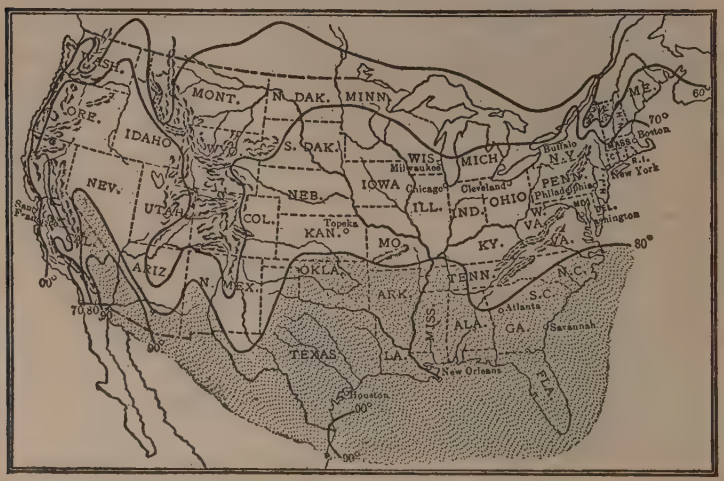


FIG. 271.

Isothermal chart of the United States for July. Notice the influence of the Rocky Mountains. Of the Appalachians. Why is it cooler on the west coast than on the east coast? What makes the isotherms bend northward in the Mississippi Valley?

currents? (11) Tell about the eddies in the southern oceans. (12) In what ways is the Labrador current of importance? (13) What influence has it in North America? (14) What is the influence of the Japanese current? (15) Tell about the influence of the Gulf Stream on the Arctic Ocean. (16) On Europe. (17) On the building of coral islands. (18) What is the effect of the cold current flowing along the northeast coast of Asia?

Distribution of Temperature. — (19) What about the change in temperature from equator to poles, if the earth were a round ball of glass? (20) How is this change interfered with? (21) What is an isothermal line? (22) An isothermal chart? (23) Relate some facts about the isothermal lines for the United States. (24) About those for the world.

SUGGESTIONS. — (1) If your home is upon the seacoast, find out about the high and low tides for several days in succession. (2) Notice the relation between the height and the time of high tide, on the one hand, and the changes in the moon, on the other. (3) Does the government spend money near your home to remove materials which the tidal currents have brought? (4) What course might a vessel take in order to be carried from Europe to America and back again by ocean currents? (5) What precautions do vessels take to avoid running into one another in dense fogs? (6) How do they try to avoid collisions with icebergs? (7) Does the presence of a warm or cold current near a country necessarily greatly affect the climate of that country? (8) Locate the cold ocean currents of the world; the warm currents. (9) Estimate the length of the circumference of the great eddy in the North Pacific.

FIG. 272.

Sitka and Three Sister Mts., Alaska. Notice the Greek Church in center of picture.

IV. PEOPLES

Divisions of Mankind. — Man, like plants and animals, varies in different parts of the world. He is influenced by his surroundings, as they are, and in the course of time has developed differently in the various lands of the earth. Concerning the *origin* of the human race, and its divisions, people hold different views; but mankind in general may be divided into four great groups.

Ethiopians. — All together there are about one and one half billion human beings upon the earth, or twenty times the number in the United States. Of these the lowest are the negroes, or *Ethiopians*, often called the black race (Fig. 275), who number about one hundred and seventy-five million. There are many subdivisions of this group, but they are all characterized by a deep brown or black skin, short, black, woolly hair, broad, flat noses, and prominent cheek bones.

The home of the Ethiopians is Africa, south of the Sahara desert, though many have been transported to other lands as slaves, and have there mingled more or less with the other races. In their original home they are savages, or barbarians of low type.

FIG. 273.

Native Kanaka boys with surf boards and canoe, Hawaiian Islands. Kanaka boys and girls are expert swimmers.

The native Australians, the Papuans of New Guinea, the Negritos of the Philippines, and the blacks on some other islands in that part of the world resemble the negroes most closely, though differing from them in some important respects. They are shorter, for example; their hair is less woolly, their noses straighter, and their lips less thick.

American Indians. — A second great division of the human race is that of the *American Indians*, often called the *red race* (pp. 30–32) (Fig. 275). It is the smallest of the four groups, numbering about twenty-two millions. These people, who in some respects resemble the Mongolians, were in possession of both North and South America when Columbus discovered America. They are distinguished by a copper-colored skin, prominent cheek bones, black eyes, and long, coarse, black hair (Figs. 286 and 298).

FIG. 274.

Japanese women.

Mongolians. — The third division, the *Mongolian* or *yellow race*, numbering about five hundred and forty millions, are typically Asiatic people, the greater number being found in Asia and the islands of the Pacific.

The Mongolians, typically represented by the Chinese and Japanese (Figs. 274 and 275), have yellowish, or in some cases even a white skin, prominent cheek bones, small, oblique eyes, a small nose, and long, coarse, black hair. In places, as on the more remote islands, the Mongolians are uncivilized; but the great majority may be classed as civilized people, although their standard of civilization differs from that of the white race.

Caucasians. — By far the largest and most civilized of the four divisions of mankind is the *white* or *Caucasian race*, which numbers about seven hundred and seventy millions. Their original home is

not known. With the dawn of history the white peoples of Europe were mostly barbarians; but civilization had begun to develop in southern and western Asia and along the shores of the Mediterranean Sea.

While for various reasons the Caucasians differ greatly in characteristics, two main branches are recognized: (1) the fair type (Fig. 275), with florid complexion, light brown, flaxen, or red hair, blue or gray eyes, and height above the average; (2) the dark type (Fig. 276), with fair skin, dark brown and black hair, often wavy or curly, and black eyes. In temperament both are active, enterprising, and imaginative, though the fair type is more stolid, the dark type more emotional.

Distribution of Races. — For centuries these four great divisions of the human race have been changing within themselves until there are now many subdivisions of each group. By war and invasion they have encroached upon one another, and have intermixed to some extent. But the leaders are the whites, who, having learned the use of ships in exploring distant lands, have spread with a rapidity never seen before. Also, being more advanced than the others, the white races have readily conquered the weaker people and taken their lands from them. They now dominate the world, the only division that has held out against them being the Mongolians, whose very numbers have in large measure served to protect them.

Distribution of Religion. — Every race has some form of religion. Among savages it is little more than superstition. They are surrounded by nature, which they do not understand. They seek a cause, and, seeing none, are led to believe in spirits which they try to comprehend. Some they suppose to be evil, others good. Believing that these spirits have great influence over their lives, they try to win favor with them by offering sacrifices and worshiping them.

Such religion, if it may be so called, takes many forms. Some races, as the negroes, believe in witchcraft; and among them the witch doctor is sometimes more powerful than the ruler himself. To ward off evil influences charms are worn, gross rites are observed, and images or objects, called *fetishes* (Fig. 278), are worshiped because they are believed to possess magic power. Among objects worshiped are fire, the sun, the earthquake, and many animals. So far as the idea of God is concerned, if these people have any conception of Him, it is of the crudest kind. The negroes, the Indians, the Eskimos, and even our own ancestors a few thousand years ago, had little more than this form of religion.

FIG. 275.

Races of mankind. Red, or Indian, upper left; black, or Ethiopian, upper right; white, or Caucasian, middle; yellow, or Mongolian, lower right; brown, or Malay (a branch of the yellow race), lower left.

tianity has been one of the chief factors in making civilization possible.

Religious belief has had much to do with inventions and the growth of industry. The Chinese, for example, have long opposed new inventions because their ancestor worship cultivated undue reverence for past customs; also they have been unwilling to dig into the ground, for fear of disturbing the evil spirits that are supposed to dwell there. Partly for such reasons, our study of geography is chiefly concerned with Christian countries; for there we find the most varied and extensive uses of the earth in the service of man.

FIG. 279.

A statue, or idol, of Buddha in Japan.

REVIEW QUESTIONS. — (1) Tell about the Ethiopians; their characteristics and distribution. (2) Do the same for the American Indians. (3) Mongolians. (4) Caucasians. (5) Give reasons for the greater advance of the Caucasians. (6) Tell about the distribution of religion. (7) Give some facts about Heathens; Buddhism and Brahminism; Jewish religion; Mohammedanism; Christianity.

SUGGESTIONS. — (1) What members of the divisions of mankind — other than whites — have you seen in your own neighborhood? (2) What different nationalities of whites? (3) Find pictures illustrating human life in the various zones. (4) Help to make a collection of pictures for the school, to illustrate the various forms of shelter and clothing. Also find such pictures in this book. (5) Find some one who has specimens of primitive implements, as Indian arrowheads, and examine them. (6) Find out something about the ways in which savage races ornament their clothing and person.

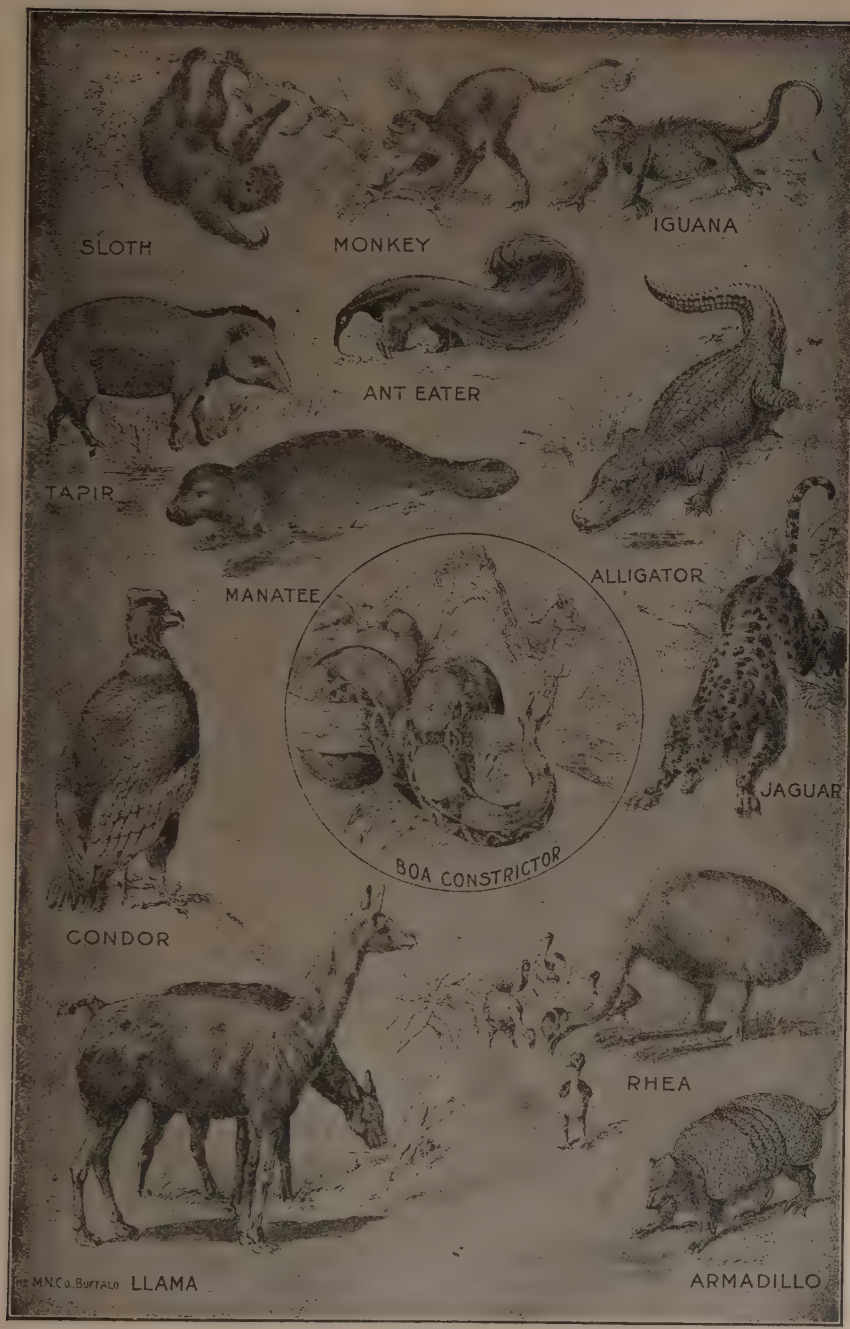


FIG. 280.

Some of the animals of South America.

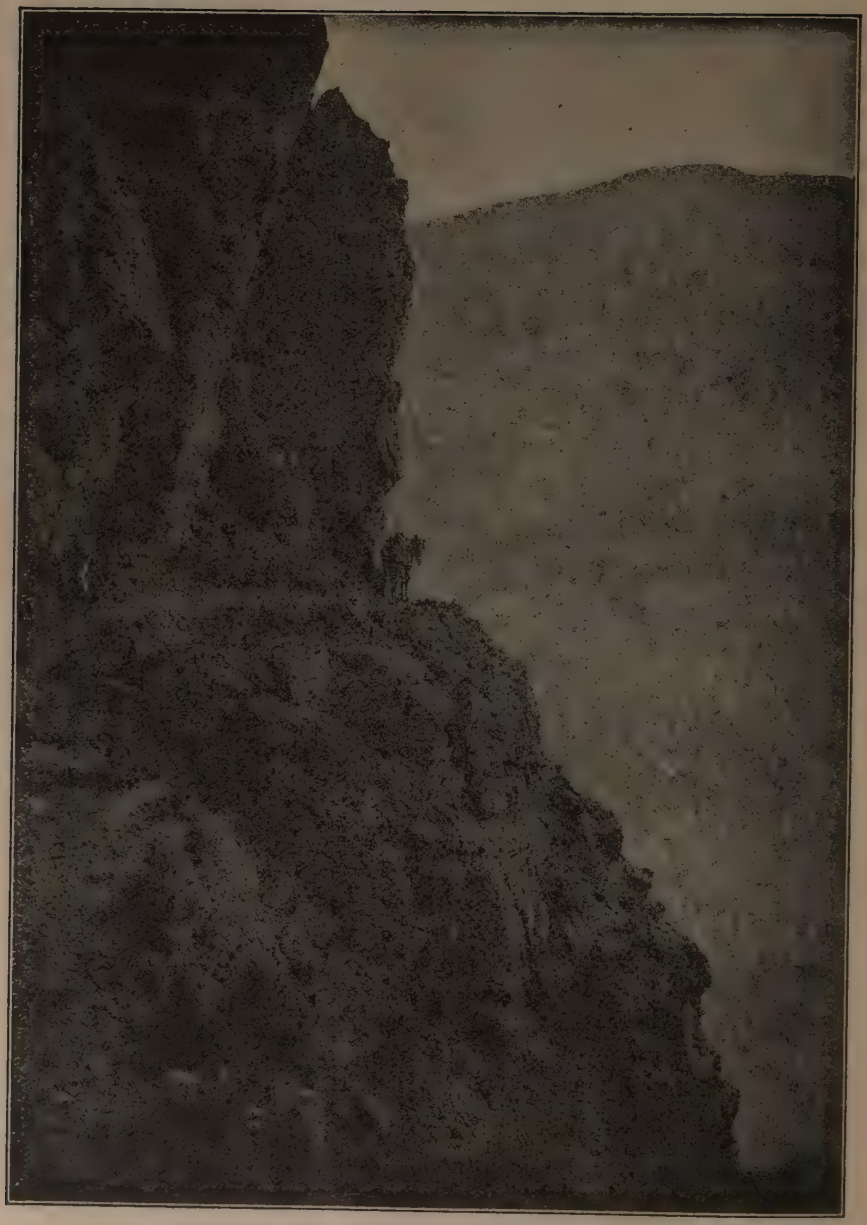


FIG. U.

A Trail in the Andes Mountains of South America

FIG. 281.

MAP QUESTIONS. — (1) In what zones does South America lie? (2) What would you expect the climate to be in the northern part? In the central part? In the southern part? (3) During what months does winter come in the extreme south? (4) What large rivers drain the continent? (5) Do you find any lakes? (6) To what extent is the coast line irregular? (7) Draw an outline map and locate upon it the mountains and rivers. Add the boundary lines of the principal countries. (8) Are there many islands? Where are most of them? (9) Find Cape Horn. It is south of what island? What strait separates this island from the mainland? (10) Which country has most railways? What does this indicate about the people? (11) In what zone is that country? How may the climate have influenced the building of railways?

FIG. 282.

Relief map of South America. In what portion are the highlands? Which are highest? Locate the lowlands.

Part III

SOUTH AMERICA

Physiography. — North and South America resemble each other in several respects. The former is triangular in shape and has its main highland masses on the two sides. What are their names?

Fig. 283.

Chimborazo, Ecuador, 20,500 feet high; so high that, though under the equator, it is snow-covered.

The western mountains are the younger and loftier, and they have many volcanic cones. They occupy a great breadth of country, the westernmost, or Coast Ranges, rising from the very shores of the Pacific. Between the extensive highlands on the two sides of the continent are low plains stretching from the Gulf of Mexico to the Arctic Ocean.

South America is likewise triangular in shape, broad at the north and tapering toward the south, and its principal highlands are on

the two sides (Fig. 282). Those on the west, the *Andes* (Fig. 283), form one of the loftiest mountain systems in the world, and between the ranges are included deep valleys and lofty plateaus. Throughout the entire length of the continent these mountains, rising from the very seacoast, extend inland for a distance of many miles. Many of the highest peaks are volcanic cones, one of them, Aconcagua, in Chile, reaching an elevation of nearly twenty-three thousand feet.

On the eastern side of South America the most extensive highlands are those in eastern Brazil (Fig. 282). This region, like New England, consists of ancient rocks, rising in the form of high hills and low mountains. The highest point is a little over ten thousand feet. The Guiana highland (Fig. 282), between the Amazon and Orinoco rivers, resembles the upland of Brazil and may be considered a part of it, although separated from it by the Amazon lowland. The remainder of the continent is lowland (Fig. 282) and mainly a vast plain extending from southern Argentina to the Caribbean Sea.

In South America, as in North America, the growth of mountains has raised the two sides of the continent and left a depression into which the sea once entered. But waste from the mountains, washed down by rain and rivers, has filled this depression and built the broad plains that are now there. By uplift these plains have been elevated to form dry land.

In two important respects North and South America are unlike in physiography. In the first place, their large rivers flow in different directions. Describe from memory the three or four principal river systems of North America. (Or see Fig. 42.) Make a sketch of the three largest rivers of South America. One of these is the largest in the world. Which is it? Which one most nearly corresponds to the Mississippi in position and direction of flow?

A second difference between the two continents is in regard to their coast lines. It will be remembered that much of the North American coast has been made irregular by the sinking of the land. Much of the South American coast, on the other hand, has been rising. In the former case, many fine harbors were formed; in the latter, the coast line is made straight because the level sea bottom is being raised. Notice how very regular is most of the western coast of South America. It is the longest regular coast line in the world; for a distance of three thousand miles there is a general absence of good natural harbors. What effect must this have upon the development of the continent?

Climate. — A large portion of South America lies in the tropical zone and consequently has a hot climate. Where does the Tropic of Capricorn cross the continent? The portion south of this tropic reaches into the south temperate zone, and its climate, therefore, resembles that of the United States. What countries of South America are partly or wholly in the temperate zone? During what months do they have summer? What effect on temperature are their north winds likely to have?

The winds, together with the highlands, are the key to the rainfall. On the map (Fig. 247) it is seen that the belt of calms extends across the continent in the neighborhood of the equator. North of

FIG. 284.

A view on the arid plateau of Bolivia — a train of alpacas is crossing here.

this belt the northeast trade winds blow Fig. (247), while south of it is the zone of southeast trade winds. Still farther south are the horse latitudes, and then come the prevailing westerlies (Fig. 249), which blow across the southern end of the continent.

We may therefore expect heavy rainfall in the vicinity of the equator (Fig. 251), where the air is constantly rising. The northern coast must also receive abundant rains because the trade winds come from the ocean and are forced to rise in passing over the slopes. The highlands in eastern Brazil must likewise be well watered by the vapor-laden southeast trades (Fig. 251). Of course, these winds lose much of their moisture in traveling across the continent, but on approaching the Andes they are forced to a sti

greater height; accordingly, the eastern side of these ranges is wet by frequent rains.

South of the belt of calms, both in the trade wind and horse latitude belts, the western slopes and the valleys of the Andes (Fig. 251) are far too arid for agriculture without irrigation. In this region large areas are veritable deserts. This arid condition is due to the influence of the mountains, which interfere with the trade winds so that the prevailing winds are from the south, and therefore parallel to the coast (Fig. 249). Since these winds are blowing *toward* the equator, and therefore becoming steadily warmer, they do not give up their moisture and form rain. Thus there are deserts on the very coast.

Farther south the influence of the prevailing westerlies is felt. In this part of the continent, therefore, it is the *western* side that receives the rain, while the eastern part is dry (Fig. 250). In rising over the land these winds cause abundant rainfall in southern Chile; but, being robbed of their vapor as they cross the mountains, they descend as dry winds upon the plains of Patagonia. With what portion of the United States may the climate of this region be compared?

From the above we see that while most of South America is well supplied with rain, two extensive areas on opposite sides of the Andes are arid. Locate them (Fig. 250).

The heavy rain in the tropical section of the continent supplies the three great rivers with an abundance of water, and encourages a rank growth of tropical vegetation. But each year, as the season changes, the belts of rainfall migrate northward and southward (Figs. 255 and 256). Therefore on each side of the equator is a belt where the rainfall varies with the season, being dry at one time of year and well watered in the opposite season. In the rainy season the rivers are flooded, and vegetation grows profusely; but with the dry season the streams shrink in size, and the plains become dry and parched. It is because of this dry period that there are open *savannas*, or grassy plains, both north and south of the equatorial forest. They are called *llanos* in the Orinoco valley, *campos* in Brazil, and *pampas* in Argentina. Here trees cannot survive the drought; but grass is able to mature its seeds during the rainy season, then dies down to the ground and remains dormant until the next period of rains.

Plant and Animal Life. — In the warm, rainy belt the great humidity and high temperature are favorable to an extraordinary growth of plant life. So dense are the vast jungles of the Amazon

that travel through them is almost impossible (p. 294); in fact, much of this forest wilderness has never been explored.

In the desert of the west coast, on the other hand, plant life is very scanty (Fig. 284). There are some parts, for instance the desert of Atacama in northern Chile, where there is almost no life of any kind.

In those sections where the climate is cool and the rainfall moderate, as on the mountain slopes and in the south temperate zone, the land is forest-covered. The extreme southern part of the continent has a climate so cold that the plants become dwarfed, as in the case near the tree line in northern Canada.

In the tropical forest there is a great variety of tree-dwelling animals, among which are many insects and beautiful birds. Among the larger animals may be mentioned the fruit-eating monkey, the fierce jaguar (Fig. 280), which preys upon other animals, and the sloth (Fig. 280), a

FIG. 285.

Tropical vegetation in the damp lowlands of Ecuador, where there are heavy equatorial rains. The boats are dugouts, that is, logs hollowed out in boat form by natives.

creature which sleeps suspended, back downward, from the branches of the trees. There are also many reptiles, including serpents and the iguana (Fig. 280), a tree lizard often several feet in length. Some of the serpents are small and poisonous; others, like the boa constrictor (Fig. 280), are large and powerful enough to crush a deer in their coils. The boa, coiled among the trees awaiting its prey, resembles a vine.

The beautiful butterflies and ants are most noticeable among the insects. Among the most interesting insects are the termites, commonly

called white ants, which live in colonies, and build houses of earth. With so many insects there are naturally numerous species of insect eaters. One of the most interesting of these is the ant-eater (Fig. 280). Its long claws are adapted to digging the ants from their earthy or woody dwelling places, while its sharp-pointed snout and long tongue aid it in finding and devouring its food.

Besides these animals there is the tapir (Fig. 280), five or six feet in length, which wanders about at night, feeding along the watercourses; and the armadillo (Fig. 280), a burrowing animal protected by an armor. When attacked by an enemy, the armadillo rolls itself into a ball, inclosing its soft under parts. In the river waters and swamps are fishes, turtles, and alligators (Fig. 280). The turtle eggs and fish are among the principal food for the forest Indians. Here also is found the manatee (Fig. 280), or sea cow, a mammal that has become adapted to life in the water. It lives both in fresh and salt water, and ascends the Amazon even as far as Ecuador.

On the open plains, herds of deer roam about, and also the rhea (Fig. 280), — often called the American ostrich, — one of the few large running birds. It lives on the open plains, as in Patagonia, where are also found herds of guanaco, a kind of wild llama.

Among the crags and peaks of the Andes dwells the condor (Fig. 280), the largest of the flying birds — so large that it kills and carries off small deer. In the mountain valleys live the llama (Fig. 280), and its allies, the vicuna and alpaca, both wild and domesticated (Figs. 284 and 301). Like other mountain dwellers the llama is sure-footed on the rocks, and is thus of great use as a beast of burden; and the cold climate causes it to have a thick coat of wool which is of value to man. Because of its usefulness the llama is sometimes called the American camel.

Fig. 286.

A cannibal girl from the tropical forest of Peru.

The People.—When South America was discovered by Columbus, it was inhabited solely by red men. Of these many were typical savages; and even at the present day some of the forest Indians are savages, living solely upon fish, game, and the abundant fruits. It is unsafe for white men to go among them, and indeed there are forest tribes which still practice cannibalism.

Along the coast and some of the larger rivers the red men found by the early explorers were more advanced. Like most of the North

American Indians, they were in the lower stages of barbarism. In a crude way they cultivated the soil and manufactured a few simple implements. Many Indians in the more remote districts still live in this primitive way, though large numbers have mixed with the white settlers and adopted their customs.

But among the Andes, especially in Peru, Bolivia, and Ecuador, the Spanish explorers found tribes of Indians, under control of the Incas, who had developed far beyond their neighbors. Indeed, like the Pueblo and Aztec Indians of North America (p. 31), they had

FIG. 287.

A bridge made by the Indians.

reached the early stages of civilization. The temperate climate of their mountain valley homes favored advance. And the protection from the inroads of their more savage neighbors, which the arid country and mountain barriers offered, gave them the opportunity to develop arts and to advance in other ways.

The Spanish, encouraged by the discovery of rich deposits of gold and silver, seized almost all of South America except Brazil, which was settled by the Portuguese. They treated the aborigines with great cruelty, especially the Incas, whom they robbed of their treasures and reduced to slavery. As in North America, the Span-

iards intermarried freely with the Indians, so that the present inhabitants of South America are to a large extent of mixed blood. The introduction of negro slaves had led to a still greater mixture of peoples. Therefore, while there are still pure-blooded Indians and negroes, and also pure-blooded white men, especially Spanish and Portuguese, the greater number of the South Americans are a mixture of two or more of these very different races. This fact is one of the main reasons for the unstable governments of some of the South American countries.

Spain maintained her control in South America for fully three hundred years. But in the early part of the nineteenth century the colonies revolted and established themselves as independent republics, modeled after the United States. They were led to fight for their independence partly because of the success of our own Revolution, but chiefly because of oppression by the Spaniards, who treated their colonies merely as sources of wealth.

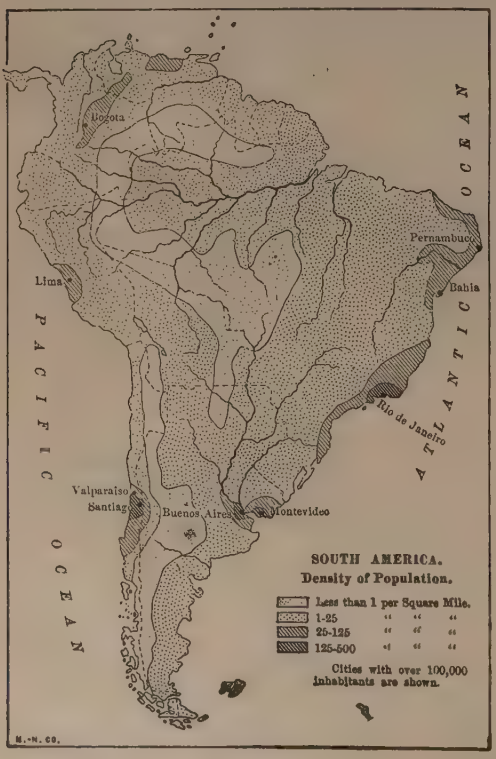


FIG. 288.

Brazil also became independent of Portugal, and, after being for a long time ruled by an emperor, established a republican form of government in 1889. Of late there have been many immigrants from European countries, especially from Germany and southern Europe. Special inducements have been offered to such colonists, and the recent development in portions of South America, particularly of Argentina and southern Brazil, has been partly due to these immigrants.

BRAZIL

Physiography and Climate. — This is the largest

country in South America. It is even larger than the United States without Alaska, and nearly as large as Europe. While extending north of the equator on one side, it extends into the south temperate zone on the other side. How many degrees of latitude does it include? Since so large a part of Brazil is in the torrid zone and on the eastern slope of the continent, its climate is not only warm but moist. Why the latter?

Eastern Brazil is a highland of ancient mountains worn down to the condition of hills and low mountains. Numerous streams drain this upland in various directions. Point out some of these (Fig. 281). Trace the divide between those flowing into the Amazon and Parana and those flowing into the Atlantic. What is the name of the largest river emptying directly into the Atlantic?

The northern third of Brazil is mainly a vast level plain, throughout most of its extent occupied by dense forest and drained by the Amazon. What is the condition on the campos? Why? (p. 288). The rainfall in the Amazon valley is so heavy and the slope of the land so gentle, that the Amazon and its larger tributaries are swollen to great breadth. At times of flood the rivers overflow the surrounding country and transform it to an immense swamp through which many branching channels extend. In places the Amazon is several miles in width, and resembles a great lake rather than a river. Boats are able to pass up the river nearly to the base of the Andes, a distance of twenty-two hundred miles from the seacoast. Some of the tributaries are also navigable. Along the route of navigation there are settlements, such as MANAOS which is

FIG. 289.

Some of the Indians of tropical South America. Notice the nose and lip ornaments.

reached by ocean steamers; but at a distance from the river there is nothing but an almost unknown wilderness (Fig. 288).

The Tropical Forest. — The Amazon forest offers a typical illustration of the tropical forest, where plants, encouraged by the uniformly high temperature and great dampness, grow luxuriantly in the rich soil. Not only is the rainfall heavy, but evaporation is retarded by the dense vegetation, so that the forest is reeking with moisture. Consequently at night time, when the temperature falls, such heavy dews collect that the plants are wet by them as by a rain.

One of the features of such a forest is the dense gloom and the silence, broken now and then by the crash of a falling tree, or the sorrowful notes of birds, or the frightful howling of monkeys, or perchance the shrill scream of an animal which has fallen a prey to the boa (Fig. 280). Why might we expect the animals in large part to be tree dwellers?

To one whose home is in the temperate zone the tropical forest appears very strange, for the woods are much the same throughout the year. There is no time when all the trees send forth their leaves and blossoms; nor is there a time when all the leaves change and fall to the ground. Some of the trees blossom throughout the year; others have their blossoms at regular seasons; thus flowers and fruit may be seen at all times of the year.

Products of the Forest. — Among the trees of the tropical forest are many useful kinds. Some produce gums, such as *caoutchouc*, from which rubber is made; or edible fruits and nuts, or valuable timber and dyewoods. In fact, the name *Brazil* is derived from a word applied to a dyewood found in the Amazon forests.

Fig. 290.
An Indian hut on the Amazon.

Many of the inhabitants near the rivers, who have partially adopted the customs of civilization, make long journeys into the forest to collect the products, both for their own use and for shipment down the Amazon. But the difficulties of travel, and the warmth and dampness of the climate, are opposed to much work.

The Indians still cultivate the *mandioca*, which was one of their principal sources of food when white men appeared. This plant has beneath the soil an enlargement of the root which in shape resembles a long sweet

potato. A dish of dry meal, or *farina*, made from the mandioca is commonly seen on Brazilian tables, and it is often stewed with beans. Mandioca bears much the same relation to these people that wheat bears to those who live in temperate climates. It is from this plant that *tapioca* is made.

Rubber. — The natives are also engaged in obtaining *rubber*, a product of immense importance because of its many uses, for example, as a packing around the valves of machinery, and as an insulator around wires and cables. Name other uses of rubber.

Coffee Raising. — The coffee tree is a native of Abyssinia in Africa. It was introduced into Brazil in the eighteenth century

FIG. 291.

A part of the city and harbor of Rio de Janeiro.

and has proved so successful that Brazil now produces more than one half of all the coffee raised in the world. Coffee is cultivated all the way from southern Brazil to the Amazon, and there are fully five hundred million coffee trees in Brazil alone (Fig. 200).

Formerly most of the Brazilian coffee left the port of RIO DE JANEIRO, but now more than half of it is sent from SANTOS. Coffee is the principal export of Brazil, and much of it comes to the United States.

Other Industries in Brazil. — On the highlands of Brazil, where coffee raising is carried on, other crops are also produced, such as cotton, sugar, tobacco, fruit, and corn. Much cocoa is cultivated in the tropical section, and in the extreme south many cattle are raised. The rocks of the highlands have produced some valuable minerals, especially gold and diamonds. Indeed, at one time, the southern part of Brazil was the principal diamond-producing region in the world. Both coal and iron are also present, though they are not yet extensively mined.

Cities. — The capital and largest city of the republic is RIO DE JANEIRO, a city of over eight hundred thousand people, and the second in size in South America. It is situated upon a fine harbor (Fig. 291) and is surrounded by excellent farming country and coffee plantations. Several other Brazilian cities are seaports connected with the interior by short railway lines which bring the coffee and other products for shipment. The most important are BAHIA, SANTOS, the seaport of SÃO PAULO, and PERNAMBUCO, the chief port for the export of sugar and cotton. Compare the size of each of these with some city in the United States (Tables in Appendix, pp. iv–viii). On the Para River, near the mouth of the Amazon, and connected with it by a branch of the river, is PARA, from which most of the rubber, vanilla, and other products from the Amazon forest are shipped to America and Europe.

ARGENTINA

Physiography and Climate. — This is by far the most advanced of South American countries, and the reasons are not difficult to understand. In the first place, Argentina extends from just within the torrid zone to the extreme southern end of South America. Thus the country is for the most part within the temperate zone, the climate of which favors the development of energetic people. Also the *range* of climate, from arid to rainy (Fig. 250) and from tropical to temperate, insures a considerable range of products. A second reason for rapid advancement is the fact that, while there are mountains in the west, the remainder of the country is largely one vast expanse of *pampas* (Fig. 292). These open, treeless plains have made it easy for settlers to move about and to carry on the industries of farming and ranching. This is quite in contrast to the unfavorable conditions in the Amazon valley; but it may be com-

pared with the ease of settlement which the plains and prairies of the United States have afforded.

Such favorable conditions have served to attract many immigrants from Europe, and there is, therefore, a larger percentage of pure-blooded whites here than in other parts of South America. Largely for this reason the government of Argentina is decidedly better than that in most South American countries.

Cattle Raising. — The open plains are well adapted to ranching, and it is estimated that there are nearly 100,000,000 sheep and 25,000,000 cattle in this country. Stock raising in Argentina differs in some respects from ranching in the United States (pp. 128 and 161).

FIG. 292.

On the pampas of Argentina.

Formerly the herds roamed over the plains, feeding on government land, as is the custom in the United States. The government of Argentina, however, recognizing that ranching would be more successful if the cattle owners controlled large bodies of land, has been in the habit of selling large tracts to the ranchmen, who after purchase fence in their land. In western United States, on the other hand, ranchmen cannot obtain large tracts of government land because of the laws which restrict its sale to small blocks. But some of our western land, owned by the railways, may be bought in large tracts, and there the custom is growing to purchase and fence land, introduce better stock, and care for it, as in Argentina.

Farming. — The climate and soil in many parts of Argentina are favorable to agriculture. In the warm northern portion sugar cane,

coffee, and tobacco are produced; in the more temperate part, where the rainfall is sufficient, grains and alfalfa are raised. There is also much fruit raising, especially grapes, from which wine and raisins are made.

Wheat is the most important agricultural product, the value of the crop being fully $50,000,000 a year, making the Argentine plains one of the great wheat-producing sections of the world. The climate is favorable, the soil fertile, and the land level or gently rolling, as in Minnesota and the Dakotas. Agriculture in the extreme south is prohibited by the cold; but sheep raising is carried on even in Patagonia and on the stormy islands beyond the Straits of Magellan.

Manufacturing and Commerce. — Besides the industries mentioned above, there is some lumbering and mining in the mountainous portion. But although the words *Argentina* and *Plata* mean silver, their use as proper names comes from the fact that the natives wore silver ornaments, rather than from any abundance of the white metal in Argentina.

In the large cities there is much manufacturing, largely connected with the raw products of the country, as, for instance, dairying, woolen mills, flour, sugar, wine, and cotton manufacturing, the preparation of hides, etc. Nevertheless, a large part of the raw products is sent abroad, particularly wool, sheepskins, hides, wheat, corn, and meat. On the other hand, machinery, cloth, and other manufactured articles must be imported.

With such a development of the resources it is natural that there should be means of ready transportation. The broad Parana River, which empties into the Plata estuary, offers extensive water connection with the interior; and railways ramify the well-settled portions of the country, connecting all the important cities. In fact, because of the superior development of Argentina, there are more railways here than in any other South American country. In resources, industrial development, government, and educational system Argentina, of all the South American countries, bears the closest resemblance to the United States.

Cities. — By far the most important city is BUENOS AIRES, which is the largest city in South America, and one of the great cities of the world. There is a certain resemblance between Buenos Aires and New York, the metropolis of North America.

Each is situated on a good harbor on an estuary, and each has water connection with a very productive interior having a temperate climate.

Moreover, from various parts of the interior, in each case, railway lines converge toward the seaport, while steamship lines extend to all quarters of the globe. New York, however, is a gateway to a much larger and more varied country, and one of greater resources. In addition, New York has been developed for a longer time. Consequently it is much larger than Buenos Aires.

Buenos Aires is a busy and rapidly growing city with much manufacturing, especially flour milling, brewing, and the canning and preserving of meat. It also has an extensive commerce. Just below the city, on the Plata estuary, is the seaport of La Plata; and upstream, on the Parana, is the rapidly growing city of Rosario, which is an important railway center as well as a river port. In the interior are a number of towns and cities, among which the railway center Cordoba is the largest.

Uruguay and Paraguay

Uruguay. — Like so much of Argentina, this is a region of plains, well watered and excellently adapted to agriculture. Naturally, therefore, cattle and sheep raising are important industries. But

Fig. 293.

Ranch houses on the plains of Uruguay.

although the climate and soil are favorable to the same crops that thrive in northern Argentina, there has been little progress in agriculture. Indeed, quite in contrast to its neighbor Argentina, this country is but slightly developed. The government is very bad indeed, for a few men control the army and make and unmake presidents almost at will.

The principal products of Uruguay are those connected with cattle and sheep; namely, dried beef, corned beef, ox tongues, hides, tallow, horns, sheepskins, and wool. The famous Liebig extract of beef is made in this country. The company disposes of more than

one thousand cattle a day during the summer months, and exports tongues, canned meats, beef extracts, and other products, to the value of $15,000,000 a year.

The capital and largest city is the seaport of MONTEVIDEO, situated at one end of a semicircular bay on the Plata estuary.

Paraguay. — Like Bolivia this little country is without a seacoast, though it has access to the sea by way of the Parana River. It is a region of hills and plains covered with forests in part, but with many tracts of pasture land upon which large herds of cattle feed. The climate is hot and dry, with most of the hot winds from the north. Fortunately most of the rain falls during the hot summer, when the ocean winds blow toward the heated land.

The agricultural products are those of the warm temperate and tropical zones, including tobacco, rice, sugar cane, and oranges, while from the forests rubber, dyewoods, and valuable timber are obtained. There is but one railway, which connects the capital, ASUNCION, with Montevideo on the sea.

A peculiar product, and the principal export of this country, is *yerba matè*, or *Paraguay tea*. Although not used as extensively as our tea, which comes mainly from China and Japan, it is very popular in South America, where its use was learned from the red men.

THE GUIANAS AND VENEZUELA

The Guianas. — North of Brazil are three small countries, the only portions of the South American continent now under control of European nations. They belong to Great Britain, Holland, and France, respectively, and are known as *British Guiana*, *French Guiana*, and *Dutch Guiana*, or *Surinam*. Find the capital of each. Gold is obtained in each of the Guianas, although the development in this direction has gone little farther than the washing of gravels.

In these small countries a large part of the surface is still a forest wilderness inhabited chiefly by Indians who have little contact with white men. This tropical forest, like that of the Amazon, which it closely resembles, supplies rubber and valuable timber; but its resources are only slightly developed. Near the coast, however, there is a strip of cultivated land from which is obtained sugar cane, bananas, cotton, and a few other products. Of late, especially in Dutch Guiana, attention has been turned to the production of cocoa and coffee.

The Guianas are so slightly developed that there is but one short railway, and in most sections there are almost no roads. There are practically no exports except sugar, molasses, and rum — all made from sugar cane. Flour, clothing, and other manufactured articles are imported.

Venezuela.[1] — This country includes one of the spurs of the Andes and also a portion of the Guiana highland. But a large part of Venezuela is occupied by the broad plains of the Orinoco valley. Some of these plains, the treeless *llanos* (p. 288), are the seat of extensive cattle raising, as in the case of the pampas of Argentina. In parts of Venezuela are vast forests which produce valuable dyewoods and rubber. Among the mountains also are found rich mineral deposits, especially gold.

FIG. 294.

A cocoanut grove on the northern coast of South America.

There is some agriculture. Hardy crops, like potatoes, beans, and barley, are raised even at altitudes of eight thousand feet; but below five thousand feet are found such semi-tropical and tropical products as sugar cane, bananas, cocoa, and coffee. The latter is the chief export; in fact, Venezuela is one of the leading coffee-producing sections of South America.

The capital, CARACAS, five or six miles from the sea, is situated upon a highland over three thousand feet above sea level. It is connected with its ports by a short railway line which winds about in its descent to the sea.

[1] This name, which means "little Venice," was applied to the country because, when first visited in 1499, white men found an Indian village built on piles or posts in the water along the shores of Lake Maracaibo.

In 1812 Caracas was visited by one of the most terrible earthquakes ever recorded. It being Ascension Day, a great part of the population was at church. The first shock caused the bell to toll, but after all danger was thought past, there came a terrible subterranean noise, resembling the rolling of thunder, but louder and longer. Then came a shaking of the earth so tremendous that churches and houses were overthrown and the inhabitants buried beneath their ruins. On that day fully twelve thousand persons perished. People were told that it was sent as a punishment for revolting from the rule of Spain.

Tropical Andean Countries

Points of Resemblance. — These countries, Colombia, Ecuador, Peru, and Bolivia, are all crossed by the lofty Andes and are there-

Fig. 295.

Building houses in a clearing in the forest of Peru on the eastern side of the Andes.

fore mountainous. Each of them extends eastward beyond the mountains, to the plains of the upper Amazon and Orinoco valleys. In Colombia these plains include a portion of the llanos. The head waters of the Amazon and its tributaries in the region of the equator

have never been fully explored, and the exact boundaries of Colombia, Ecuador, and Peru have never been officially determined by treaty. For this reason maps and geographies differ widely in the matter.

There is, of course, great variety of climate in this section. Tropical heat prevails throughout the lowlands (Fig. 285); but the heavy rainfall near the equator contrasts strikingly with the arid conditions of southern Peru and northern Chile, which lie in the belt of southeast trades (p. 287).

The elevation due to mountains and plateaus also causes differences in climate. This may be illustrated by the vegetation. Up to an altitude of three thousand to four thousand feet, bananas, sugar cane, cocoa, and other plants of hot climates flourish. Above this, to an elevation of six or seven thousand feet, the cooler climate permits the growth of tobacco, corn, and coffee. From this height up to about ten thousand feet, wheat and our northern vegetables and fruits do well; but above ten thousand feet the bleak mountain peaks are too cold for farming. There is therefore a great variety of farm products in western South America.

The fact that this section is so mountainous furnishes an explanation of its importance in the production of minerals. Both gold and silver ores, and other minerals as well, are found from the northern to the southern limit of the Andes, and this is therefore one of the great mineral-producing regions of the world. It was the abundance of precious metals which attracted the Spanish to the continent.

Goaded by the Spanish misgovernment, these colonies revolted in the early part of the last century and established independent republics. But the nature of the population was such that *real* republican government was impossible. In each of the countries ambitious leaders, usually generals in the army, have again and again overturned the government. This has seriously interfered with the development of industry and commerce; for not only have lives and property been lost, but a feeling of uncertainty has been introduced which has prevented settlers from coming, and capitalists from investing money for the development of the resources.

None of the capitals of the Andean countries are on the coast, and several are in the interior at a considerable elevation above sea level. In choosing such sites the Spaniards have had the example set them both by their Spanish ancestors and by the Incas; for Cuzco, the capital of the Incas, and Madrid, the Spanish capital, are both at a considerable eleva-

tion above sea level and many miles from the coast. The principal objects in the selection of these sites are to be near the mines, to secure a cooler and more healthful climate, and to obtain protection from attack by sea.

Doubtless another reason why these cities are not on the coast is the absence of good harbors. Throughout almost its entire extent, except in the cold southern portion of Chile, the coast is wonderfully straight. Why? (p. 286). Even in the present century the coast has risen several feet in a part of Peru and Chile. This uplift occurred during earthquake shocks, and it was, without question, the slipping of the rocks that caused the shocks.

Panama. — This small republic occupying the extreme northwestern part of South America and the Isthmus of Panama is of especial importance to us, since the great Panama ship canal is being constructed across the narrowest part of the Isthmus. Of what advantage will such a canal be to the United States? What two cities are situated at the ends of this canal route? A railway connects these two cities, and many goods are carried over it; for vessels approach from one side and unload and transfer their cargoes to the other ocean, where other vessels await. Thus the long voyage around South America may be saved.

FIG. 296.
A native village on the Panama Railway.

Colombia. — This country, named after Columbus, has seacoast on both oceans. The western part is very mountainous. Here there is much mineral wealth, gold and silver being of most importance, though emeralds of excellent grade are also obtained. In the eastern portion of the country, on the other hand, are treeless llanos on which large numbers of cattle are raised, as in Venezuela. Coffee is the principal agricultural product and the chief export; but sugar cane, tobacco, and cocoa are also produced. On the mountain slopes the grains, fruits, and vegetables of temperate climates are grown.

BOGOTA, the capital and largest city, is situated far in the

interior and at an elevation of about a mile and a half above sea level. It has an agreeable climate, even though within the tropics.

Ecuador. — Why should this name, the Spanish for equator, be applied to this country? In the Andes of Ecuador there are many volcanoes, including Cotopaxi, one of the loftiest active volcanoes in the world, and Chimborazo, which is still higher but no longer active.

Naturally, because of its position, this country has a hot, damp climate near sea level, but is much more temperate on the moun-

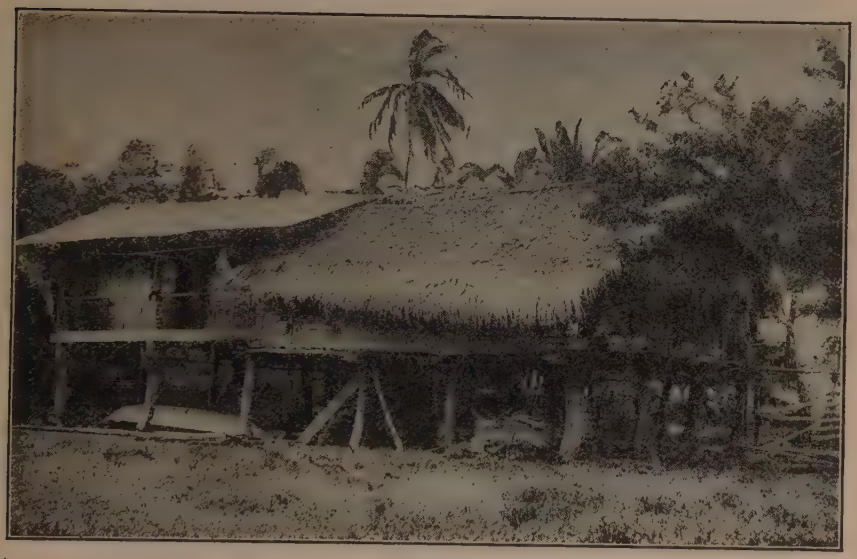


FIG. 297.

A native house in Ecuador. Can you suggest reasons for building it on posts rather than on the ground?

tain slopes. The principal occupations are cattle raising and farming. The chief farm products are wheat and barley on the highlands, and coffee, sugar cane, and *cocoa* on the warm lowlands. The last named is the most important product of Ecuador, and fully one fifth of all the cocoa produced in the world comes from that country.

Another product of Ecuador, and of some other South American countries, is *sarsaparilla*. The rubber industry is also well developed; and, now that the accessible supply from wild trees is becoming exhausted, attention is being given to the planting of rubber trees.

Even in the cities there is practically no manufacturing. One of the

reasons for this is the almost total absence of roads, making the transportation of heavy machinery very difficult. This fact also interferes greatly with mining operations among the mountains. Therefore, although there is much gold and silver, mining is as yet slightly developed.

QUITO, the capital and largest city of Ecuador, is situated among the mountains of the interior at an elevation of about nine thousand feet. Next in size is the seaport GUAYAQUIL, the westernmost of the large cities of South America. It is in W. Long. 80°. Does it lie to the east or west of Washington?

FIG. 298.

A Peruvian Indian.

Peru. — The broad, forest-covered plains on the eastern side of the rugged Andes are drained by some of the larger headwaters of the Amazon, and thus Peru is provided with water communication to the Atlantic. While much of this dense tropical forest is an almost unexplored wilderness, the mountain valleys are settled mainly by the descendants of the Incas.

In Peru there are not only variations in climate due to altitude, as in Ecuador and Colombia, but also great differences in rainfall. The heavy fall of rain on the eastern side of the Andes offers a striking contrast to the arid and even desert climate along their western slopes (Fig. 250). State the cause of this aridity once more (p. 288). So little rain falls in southwestern Peru that in some parts, even close by the sea, there is an average of but one shower in seven years.

Peru was one of the most valuable sources of gold and silver for the Spanish conquerors. The Incas who dwelt there had accumulated gold for ornament, and this the Spaniards seized. Then, opening mines, they forced the Indians to work as slaves. Since that time vast quantities of gold and silver have been obtained in that country, and valuable deposits of gold, petroleum, and copper have also been found.

There is much agriculture in Peru, the principal crops being corn, wheat, and potatoes among the mountains, and sugar cane, cotton, tobacco, and coffee in the lower, warmer sections. Even in the arid portion there is some farming; for, as in southern California, the rains and snows of the mountains supply water for irrigation in the

valleys and on the narrow coastal plains. Thus, even in the desert, there are some gardens, vineyards, and fields of cotton and sugar cane.

Cinchona, or *Peruvian bark*, from which the valuable medicine *quinine* is obtained, was known to the Incas and is still an important Peruvian product. It is obtained from an evergreen tree whose leaves resemble those of the laurel.

FIG. 299.

A view of Lima, the capital of Peru.

Before the year 1879 Peru was making rapid progress; but by a war with Chile at that time the nation became almost paralyzed. Although there is some manufacturing, especially connected with sugar production, most manufactured articles must be imported.

LIMA, the capital (Fig. 299), founded by the Spanish conquerors in 1535, is situated at the base of the Andes. CALLAO, the seaport of Lima, is about seven miles from the capital. Its harbor is but little more than an open roadstead partially protected by an island on the southwest side. However, since the winds and ocean swells are from the south, while the coast is practically never visited by storms, this slight protection is sufficient.

Arequipa, at an elevation of seven thousand feet, is separated from the sea by sixty miles of desert. Cuzco, the old Inca capital, is on an interior table-land, at an elevation of over eleven thousand feet. The ruins of the Inca citadels and "palaces" are still to be seen, and many pure-blooded and half-breed Incas still dwell in and near the city.

Bolivia. — This country, named after General Bolivar, the great South American leader in the revolt against Spain, was robbed of its seacoast by Chile. What other South American country has no seacoast? In a broad valley between the mountains is Lake Titicaca (Fig. 300), partly in Peru and partly in Bolivia. This lake, the greatest in South America, is a third as large as Lake Erie; and its elevation, twelve thousand five hundred feet above the sea, makes it the most elevated great lake in the world.

Fig. 300.

An Indian boy in a rush boat on Lake Titicaca. The fact that rushes are still used in making boats shows how these people cling to ancient customs.

The Incas occupied this region also, and mined much gold. Besides gold the Spanish discovered veins of copper, tin, and silver, so that mining has been one of the most important industries of the country. It is said that over three billion dollars' worth of silver has been secured since the Spanish discovery. Bolivia is also one of the great tin-producing countries of the world.

The mining and reduction of the ore are done by very crude methods. For example, instead of using costly machines for crushing the ore, as in the United States, one method is to roll boulders around on the ore. Since there are practically no railways, goods are transported for the most part by trains of pack mules, donkeys, alpacas, or llamas (Figs. 284 and 301). The llama here, as in Peru, is of great value to the inhabitants, not merely as a beast of burden, but also as a source of wool for clothing.

Much of eastern Bolivia, like eastern Peru and the Amazon valley, is an almost unknown forest wilderness. But in the mountain valleys and on the plateaus agriculture is carried on, with products similar to those of Peru. Most of these are consumed at home, though some coffee is exported.

Better railways and the improvement of the rivers, so as to permit river transportation to the Atlantic, are among the greatest needs of the country. Through what rivers could boats pass to the sea? Find the capital of Bolivia. LA PAZ, the largest city, has twice as many inhabitants as the capital.

CHILE

Physiography and Climate. — Since the divide between the Atlantic and Pacific drainage forms the eastern boundary line of Chile, the country is very narrow in an east and west direction. It is also very mountainous (Fig. 302). Except in the south, the coast line is regular like that of the rest of South America.

FIG. 301.

A group of llamas in the Andes.

The climate varies more than that of any other South American country. The northern part is within the torrid zone, while the southern end reaches far into the bleak south temperate zone; and on the mountain slopes there is every climate from frigid[1] to torrid. Moreover, northern Chile is arid and in places an absolute desert; but central and southern Chile reach into the rainy belt of prevailing westerlies (Fig. 249). The best developed section lies in the middle part, between the hot, arid north and the bleak, rainy south. This part of Chile is bathed by a cold current from the south, which

[1] The name *Chile* is derived from an Indian word signifying snow.

cools the air as the Laborador current chills that of New England (Fig. 264).

Mineral Wealth. — There is much mineral wealth, including lead, silver, coal, and copper. The latter is of such importance that Chile, like the United States, is one of the great copper-producing countries of the world. There are also beds of nitrate of soda which are situated in territories taken during the war of 1879–80, and at present yield the government an annual income of fully $10,000,000. Nitrate is the principal export.

FIG. 302.

Snow-covered mountains of Chile.

The nitrate beds occur in the midst of the desert of Atacama, in which rain very seldom falls. The substance occurs in layers a few inches to one or two feet thick, over an area thirty or forty miles in breadth. In color it varies, according to the impurities contained. After being dug out, the pure nitrate is dissolved and separated from the impurities, and then sold. Its chief use is that of a fertilizer, for which purpose great quantities are shipped from the port of IQUIQUE.

Agriculture, Manufacturing, and General Development. — There is much agriculture in Chile, especially in the rainy middle portion. The principal crops are the various grains, tobacco, and vegetables, thus resembling agriculture in many parts of the United States. More wheat and barley are produced than are needed at home, so that Chile helps to supply other nations with grain. Large herds of cattle are also reared, and sheep raising is one of the chief industries

in southern Chile. Hides, shoe leather, and wool are exported. More manufacturing is carried on than in most South American countries, the principal kinds being flour milling, cheese making, tanning, and shoe manufacturing; but as elsewhere on that continent, machinery and many other manufactured articles are purchased in Europe and the United States.

Chile is one of the most progressive countries in South America. Its government is stable, and its industries are well developed. This progress is doubtless in large part due to the temperate climate, which requires energy on the part of its inhabitants, and invites settlers from the temperate climate of Europe. It is interesting to note that the two most advanced nations of South America lie side by side in the temperate zone.

Cities. — The principal cities are SANTIAGO, the capital and largest city, situated inland, and VALPARAISO, its seaport. As at Callao (p. 307), the harbor of Valparaiso is open to the north; but the wind seldom blows from that quarter.

ISLANDS NEAR THE CONTINENT

The *Galapagos Islands*, about six hundred miles west of Ecuador, on the equator, are a group of small volcanic islands owned by Ecuador. They are too far from the continent to show on our map.

Just east of the southern tip of South America are the *Falkland Islands*, which belong to Great Britain. Still farther east are the islands of *South Georgia*, also British. Just off the coast of Venezuela, opposite the mouth of the Orinoco, is the low island of *Trinidad*, also a British possession. This island is especially noted for its extensive pitch lake, from which asphaltum is obtained for use in making asphalt pavements. The asphaltum oozes slowly from the ground, and, as it is dug out, more oozes forth, as if there were an inexhaustible supply beneath the surface.

West of Chile, and belonging to that country, is the island of *Juan Fernandez*. This is the island where Selkirk was wrecked, and by some is thought to be the island home of Robinson Crusoe. It seems quite certain, however, that Defoe described Tobago, just north of Trinidad.

REVIEW QUESTIONS. — (1) State some resemblances between South America and North America. (2) Describe the highland regions. (3) The lowlands. (4) In what respects do North and South America differ? (5) Tell about the differences in temperature in different parts of South America. (6) Explain the regions of heavy rainfall. (7) Where are the arid belts? Give the reasons. (8) What about the rainfall in the south? (9) Why does the rainfall vary with the season in the tropical belt? (10) What differences in the plant life are found in South America? Why? (11) Tell about the animals of the tropical forest.

(12) Of the plains and mountains. (13) Describe the Indian life in the forest. (14) What can you tell about the Incas? (15) State the main facts in the history of South America since the whites came. (16) Describe the principal physiographic features of Brazil. (17) What are the variations in climate? (18) Tell about the influence of rainfall upon the vegetation and the rivers. (19) Describe the tropical forest of the Amazon. (20) What valuable products are found? (21) What can you tell about mandioca? (22) Tell about coffee raising. (23) What other products come from Brazil? (24) Name and locate the principal cities; what can you say about each? (25) Describe the physiography of Argentina. (26) What influence have the physiography and climate had upon development? (27) How does ranching in Argentina differ from that of the United States? Why? (28) What are the principal farm products? (29) Tell about manufacturing. (30) About commerce. (31) How does Argentina differ from many other South American countries? (32) Compare Buenos Aires with New York. (33) Locate the other cities named. (34) What are the industries of Uruguay? (35) Name the capital. (36) Compare Uruguay with Argentina. (37) What about the climate and products of Paraguay? (38) Name the three Guianas. (39) What are the conditions and products? (40) Describe the physiography of Venezuela. (41) What are the principal industries? (42) What can you tell about Caracas? (43) Name the Andean countries. (44) Tell about the climate, its variations, and influence on the farm products. (45) What about the minerals? (46) What was the influence of the Spaniards? (47) Give reasons for the locations of the capitals. (48) Of what importance is the Isthmus of Panama? (49) Describe the physiography and industries of Colombia. (50) What about the capital? (51) Tell about the effect of climate on the industries in Ecuador. (52) Name the products. (53) Why is there little mining and manufacturing? (54) Locate the principal cities. (55) Tell about the physiography and climate of Peru. (56) About the minerals and agricultural products. (57) Locate and tell about the principal cities. (58) What about the large lake in Bolivia? (59) Tell about the mining. (60) The other industries. (61) The transportation of goods. (62) Describe the physiography of Chile. (63) The climate. (64) Name the mineral products. (65) What other industries are developed? (66) Why is Chile so progressive? (67) Locate the largest cities. (68) Locate the island groups mentioned.

Review and Comparison with North America. — (1) Which of the two Americas has the advantage in regard to latitude? Show how. (2) Tell about the effects of the trade winds in each continent (Fig. 251). (3) Of the prevailing westerlies (Figs. 250 and 252). (4) Locate the arid sections in each continent, and give the reasons for the lack of rain (Figs. 249–252). (5) Point out the rainiest section in each, and state the causes. (6) Which of the two continents has the better position for world commerce? Why? (7) Into what ocean do the principal rivers of South America flow? Of North America? (8) What can you say about the regularity of the coast of the two grand divisions? Which has the advantage in this respect? How? (9) Locate the principal coast cities of South America. Of North America. Give the main advantages of the location in each case. (10) What about the number of lakes in each continent and their value for commerce? (11) What interior cities in each continent can you locate? (12) Compare both Brazil and Argentina with the United States in area; in population. (13) Compare Chile with Texas in these two respects. (14) What important farm products are common to South America and the United States? (15) Name some products that are extensively raised in one and not in the other.

(16) Which parts of each continent are especially noted for cotton? Coffee? Wheat? Cattle and sheep? Copper? Precious metals? (17) What is the prevailing kind of government in North and in South America?

SUGGESTIONS. — (1) Give several reasons why South America has been much less rapidly settled than North America. (2) What parts of North America have been rising and on that account possess few good natural harbors? (3) How does the Spaniards' treatment of the Incas compare with their treatment of the North American Indians? (4) Find out some of the ways in which coffee is often adulterated. (5) Make a sand model of South America; a drawing. (6) If you were expecting to emigrate there, where would you prefer to settle? Why? (7) What products of South America are you probably seeing and using from week to week?

For REFERENCES, see *Teacher's Book*.

FIG. V.

The St. Gothard Railway on the Italian side of the Alps. Notice the three levels. At this point the railway passes through two spiral tunnels in order to climb the steep slope of the mountain valley before finally plunging into the main St. Gothard tunnel.

FIG. 303.

What reasons can you suggest for the fact that certain parts (like central Spain, northern Russia and Scandinavia, and the country between the Black and Caspian seas) are not densely populated?

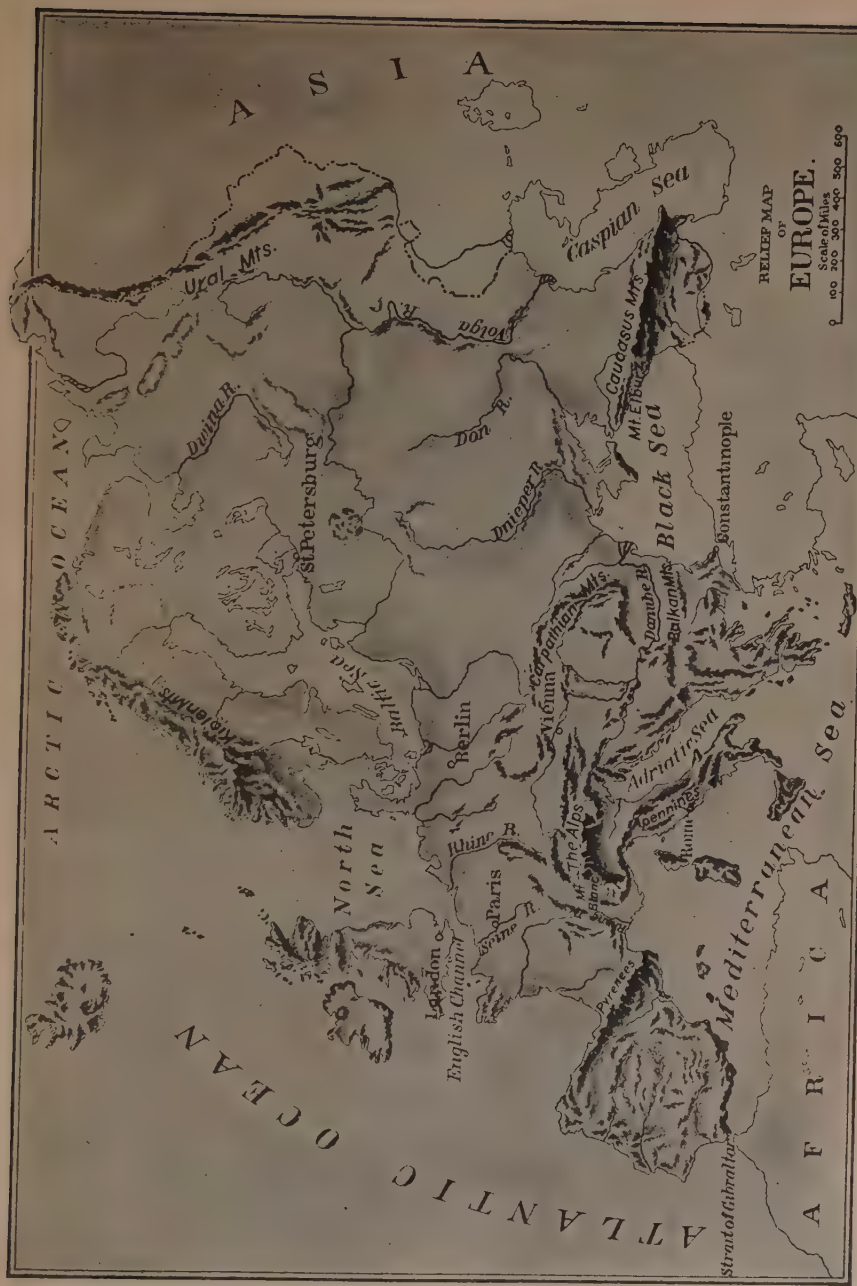


Fig. 304.

Relief Map of Europe.

FIG. 305.

Coal map of Europe.

FIG. 306.

The ice sheet of Europe.

Part IV

EUROPE

I. PHYSIOGRAPHY, CLIMATE, AND PEOPLE

The continent of Europe was named when only the southern part of it was known; that is, the portion that is separated from Africa and Asia by water. On Figure 304 find what these bodies of water are called. As exploration extended, it was found that Europe was really continuous with Asia, being in fact a great peninsula extending westward. Europe and Asia together actually form a single continent called *Eurasia;* but since Europe has been long considered a separate continent, and has figured so prominently as the home of the civilized races, it seems best to treat it separately.

On the map (Fig. 353) trace the boundary between Europe and Asia. Make an outline map, inserting the boundaries and names of the European countries. Add the names of the seas and the larger islands. What countries are partly or wholly on peninsulas? Add to the map the large rivers with their names. Where are the chief divides? Mark with heavy lines the location of the principal mountains (Fig. 304). Write their names on the map. From what has previously been learned, what can you tell about the people of Europe? About the climate? What does the peculiar condition of the Caspian Sea tell about the climate in that section?

Physiography

Highlands and Lowlands. — As in the case of North America, the development of the continent of Europe has required millions of years. Far back in time mountains appeared above the sea in the northwestern portion of the continent. Although greatly worn by the weathering of the ages, and much reduced in elevation, these mountains may still be seen in Finland, Scandinavia (the peninsula occupied by Norway and Sweden), and Scotland (Figs. 315 and 355),

as well as in Germany and Belgium. They resemble the mountains of New England and eastern Canada, that have likewise been greatly worn by weathering.

Other mountain ranges were later formed in southern Europe; but, like those of western America, they are young and their recent growth has been vigorous. Therefore the *Pyrenees* (Fig. 336), *Alps* (Fig. 379), and *Caucasus* (Fig. 307) are still of great height. Find each on Figure 304. The mountains of North and South America form continuous chains, with the highest ranges in the west, extending north and south. But in Europe the loftiest moun-

FIG. 307.

A view over the snow-capped peaks of the Caucasus Mountains. A sea of fog fills the valley.

tains are in the south, extending in various directions, though mainly east and west. How does this condition promise a different effect on the climate? It is to the fact that the mountains are not continuous, and that they consist of chains extending in various directions, that Europe owes much of its extremely irregular outline.

Besides the mountains mentioned, there is a long, low chain, known as the *Urals*, which extends north and south on the eastern side, and for a part of the distance forms the boundary between Europe and Asia. Other scattered highlands are shown on Figure 304. Where mainly are they situated?

Between the low mountains of the north and east and the higher ranges of the south there is a very extensive lowland (Fig. 304).

A part of this has been submerged by the sinking of the land, thus forming the shallow Baltic Sea. Beginning in the west with southern England, and passing through Belgium and Holland, or the "Low Countries," this plain broadens as it extends eastward across

FIG. 308.

Looking across the level plain of north Germany. Peat is dug on this plain near the river.

Germany (Fig. 308), until it includes almost all of Russia (Fig. 304). Estimate its length east and west. About two thirds of Europe is included in this plain.

Coal Beds. — While these mountains and plains were forming, coal beds were also accumulating, as was the case in America (p. 2) during the *Coal Period.*

Figure 305 shows the parts of Europe in which coal beds occur. In what countries are they? Most of the coal is *bituminous* or soft coal, though there is some *anthracite.* In a number of sections *lignite*, or brown coal, is mined; and *peat* (Fig. 308) is also dug for fuel in western Europe, where the damp climate favors its formation.

The Great Ice Sheet. — At the same period that eastern North America was invaded by a great ice sheet from the north, snow accumulated on the highlands of northwestern Europe and, changing to ice, spread outward in all directions. Figure 306 shows the extent of the European ice sheet.

The Coast Line. — The irregularities of the coast line of northern Europe, like those of northeastern North America, are due to the sinking of the land. The Baltic Sea and its gulfs represent old land valleys; and the hills of this submerged land form either islands, peninsulas, or shallow banks where food fish abound.

It is well proved that, before the Glacial Period, the British Isles were connected with the mainland by low plains where the North Sea and English Channel now exist. An elevation of only a few hundred feet would restore this condition by changing the bed of the North Sea to dry land. This would then extend the continent westward beyond the British Isles, thus destroying the bays and harbors, and altering the entire outline of northwestern Europe.

Fig. 309.

A *fjord* on the coast of Norway — a mountain valley into which the sea has been admitted by sinking of the land. (See also Fig. 355.)

In southern Europe the rising and sinking of small areas of land—while the mountains were forming—has made many peninsulas, with bays, gulfs, islands, and seas between. The Mediterranean itself occupies a basin, thousands of feet in depth, formed by the sinking of this part of the earth's crust. Some of these islands, however, are partly or wholly built up by volcanic action. What volcano is on the island of Sicily? (Fig. 375.)

Climate

Influence of Latitude. — Trace the 50th parallel of latitude on a globe or map of the world. Notice that while the 49th parallel forms the northern boundary of western United States, it passes entirely south of England, crosses France near Paris, and extends through southern Germany and Russia. From this it is evident that by far the larger part of Europe lies farther north than the United States, and due east of Canada. St. Petersburg is in the same latitude as northern Labrador; and the tips of the peninsulas of southern Europe reach about as far south as the southern boundary of Virginia.

In the far north, near the Arctic, the climate is bleak, and there are barren, frozen tundras. South of this is a belt of fir, spruce, and pine, like that which stretches east and west across central Canada. But contrary to what might be expected from latitude alone, the climate in and just south of this belt of evergreen forest

permits the growth of the grains and fruits that flourish in southern Canada and northern United States. In southern Europe, in the latitude of central United States, such semi-tropical fruits as oranges, lemons, olives, and figs are cultivated. That is to say, the products of the greater part of Europe are such as grow several hundred miles farther south in eastern North America.

That these products are raised in great abundance in Europe is indicated by the number of people there; for, although the continent is much less than half the size of North America, it supports four times as many inhabitants, or nearly 400,000,000. Let us see the explanation of these remarkable facts.

Resemblance to Western North America. — In several respects the climate of Europe is so similar to that of western North America that a brief review will be useful. Recall the facts stated on pages 253, 272.

The prevailing westerlies are felt in northern Europe as in the United States. Blowing from the ocean, and, what is especially important, from across the warm ocean current (p. 267), they distribute an enormous amount of heat over the land. It is the westerlies from these warm waters, more than any other factor, that allow crops to be raised nearer the pole in Europe than in any other part of the globe. If these conditions were not present, much of that densely populated continent (Fig. 303) would be barren waste, like Labrador.

The effect of the ocean winds is naturally greatest near the coast, as in western North America. Therefore England has a mild, rainy climate; but the farther eastward one goes, the less is the influence of the ocean. Thus eastern Russia experiences great extremes of heat and cold, and there is danger of serious droughts. Compare the summer and winter temperature (Figs. 268 and 269) and the rainfall (Fig. 310) of these two sections.

Southern Europe, like Lower California, is not affected by the westerlies in summer, for it then lies within the belt of the horse latitudes. This accounts for the fact that southern Spain, Italy, and Greece receive very little rain in summer. Examine Figure 310 to see where in Europe the rainfall is light. Find some places where there is abundant rain on mountain slopes.

Influence of Cyclonic Storms. — Thus far we have seen a striking resemblance in the climates of the two continents. But there are also notable differences. The westerlies are less regular in Europe than in western North America because of frequent interruption by

the cyclonic storms, which, after passing over eastern North America, often cross the ocean and continue across Europe (p. 258). Why cannot their arrival be predicted as well as in the United States?

As in eastern United States and Canada, the cyclonic storms cause variable winds (Fig. 261). For example, when a storm center is west of the British Isles the westerlies are interfered with and the winds blow successively from all points. But while storm winds from the east bring

Fig. 310.

rain to eastern North America, the same kind of winds cannot bring rain to eastern Europe, because there is no great ocean near at hand to supply the vapor. On account of the absence of ocean water, therefore, eastern Europe has little rain, as eastern America would have if there were land instead of water to the east of it.

Effect of Mountain Ranges. — The direction in which the highlands extend is another cause of great difference between the climates of Europe and America. In America, where high mountains extend north and south along the entire western margin of the continent, the warm, damp westerlies are soon deprived of their moisture. This leaves a vast arid and semi-arid area in the interior.

In Europe, on the other hand, where the higher ranges extend nearly east and west, the mountains do not so seriously interfere with the movement of vapor to the interior. Consequently the west winds surrender their moisture only very gradually. This accounts for the fact that in the belt of westerlies, from western Ireland to eastern Russia, there is rainfall enough for agriculture.

The east-west direction of the lofty mountains has a marked influence on the climate of those portions of Europe that lie on the north and south sides. Rising like great walls, the mountains prevent south winds from bearing northward the heat of the Mediterranean basin; and they also interfere with the passage of the chilling winds from the north. We know that Florida, much farther south than southern Europe, is visited by cold waves and accompanying frosts; but mountain barriers prevent such winds in portions of southern Europe.

Inland Seas. — The numerous inland seas are another great factor in influencing the climate of parts of Europe. Draw a sketch map of Europe, locating the seas. How does the Mediterranean compare in length with Lake Superior? It will be remembered that our Great Lakes produce a marked influence on the climate of the neighboring land, moderating the heat of summer and the cold of winter. It is this influence, added to that of the mountain barrier, that gives to southern Italy, Greece, France, and Spain such an equable and semi-tropical climate. How must these seas influence the rainfall?

People

The people of Europe have never been bound closely together as one great nation with common interests. One of the important reasons for this is the fact that so many parts of the continent are quite detached from all others. Spain, for example, is not only a peninsula, but it is separated from France by a high range of mountains. The British Isles are entirely cut off by water; Scandinavia nearly so; and Italy itself is bounded on the north by lofty mountains, and by water on all other sides. It is natural that people living in such isolated positions should not feel a common interest with those who are separated from them. Thus have arisen many different customs, beliefs, and languages.

In consequence of this isolation and lack of common interests there are many more nations in Europe than in North America. Count them (Fig. 353). There have been many jealousies and disputes among them which have been settled by war, and their boundaries have been subjected to numerous changes, as one nation

or another has seized territory during war. Notice also how irregular are some of the boundary lines. Those of Germany, for example, have been determined only after the loss of tens of thousands of human lives.

Influence of the Discovery of America. — Of the many great achievements of Europeans within modern times, probably the greatest was the discovery of America. In thinking of this event we are apt to consider only the mighty influence Europe has had on America. But the New World has also exerted a powerful influence upon Europe. The encouragement given to navigation by this discovery led Europeans to explore other parts of the world. Their knowledge was thereby greatly increased and their wealth as well. Also, the crowded condition of Europe has been much relieved; for many nations have poured forth emigrants, not only to North and South America, but also to Australia and Africa, and, more recently, even to Asia.

REVIEW QUESTIONS. — (1) Give reasons for and against treating Europe as a separate continent. (2) Tell about the highlands. (3) The lowlands. (4) The coal beds. (5) The Ice Age. (6) Locate the boundary of the ice sheet (Fig. 306) on Figure 353. (7) Tell about the coast line in northern Europe. (8) In southern Europe. (9) Of what advantage is the irregularity of the European coast? (10) Give the latitude of northern and of southern Europe. (11) How about its vegetation? (12) Its population? (13) Remembering its latitude, explain the mild climate of Europe. (14) How are its regular westerlies interfered with? (15) How is the east and west direction of its mountain ranges of great importance? (16) What is the influence of its inland seas? (17) Give some reasons why Europe is divided into so many nations. (18) How has the discovery of the New World proved of great benefit to Europe? (19) In what respect is Europe the Fatherland of other countries?

CORRELATION WITH NORTH AMERICA. — (1) Compare Europe with North America in regard to highlands. (2) To lowlands. (3) Distribution of coal beds.[1] (4) Extent of ice covering. (5) Irregularity of coast lines. (6) Latitude. (7) Vegetation (see also pp. 20–21). (8) Population. (9) In what respects are the two continents alike in climate? (10) In what respects unlike? (11) Compare the number of degrees of longitude in Europe with the number in North America. (12) Are the cyclonic storms as much needed in Europe as in America? Why? (13) Why should the most densely populated part of Europe be on the western side, while the most densely populated part of North America is on the eastern side?

SUGGESTIONS. — (1) What results might follow if the mountains of Europe extended north and south near the western coast? (2) What disadvantages do some of the European countries suffer in consequence of the east and west direction of the mountains on their southern boundaries? (3) In what section would

[1] Some of these comparisons will be made easier by examining the figures on pages 254–265.

you expect to find the most wild animals? (Fig. 303.) (4) Give reasons why some European countries, such as Germany, take much better care of their forests than Americans do. (5) Can you tell about any of the great wars and great generals of Germany, England, or France? (6) Can you tell of any of the changes in boundary lines; for example, in Poland, or between France and Germany?

FIG. W.

Mirror Lake, Yosemite Valley, California.

II. THE BRITISH ISLES

Position, Size, and Importance. — London is fully seven hundred miles farther north than New York City, and the British Isles are in the same latitude as Labrador. England itself is smaller than New England; and the British Isles, including England, Wales, Scotland, Ireland, and several hundred small islands, are not much larger than the state of Colorado.

Yet in spite of their northern position and small area, the largest city in the world is located in the British Isles. More than that, Great Britain has more manufacturing, with the exception of the United States, more foreign trade, a greater number of vessels upon the sea, and more colonies (Fig. 312) than any other nation in existence (Fig. 354). There are of course reasons for these remarkable facts, and we shall next look for them.

Inhabitants. — The British people doubtless offer one important explanation of the above facts. Being so near the mainland the

Fig. 311.

Ancient cottage near the Lakes of Killarney in Ireland.

BRITISH EMPIRE.
United Kingdom, thus:...
Dependencies, thus:...
All names pertaining to the British Empire are in Gothic thus: GIBRALTAR
ARCTIC OCEAN
GREENLAND
FRANZ JOSEF LAND
ALASKA
HUDSON BAY
LABRADOR
DOMINION OF CANADA
NORTH AMERICA
NEWFOUNDLAND
SHETLAND IS.
BRITISH ISLES
LONDON
CHANNEL IS.
Paris
EUROPE
Vienna
St.Petersburg
RUSSIAN EMPIRE
Siberia
Arctic Circle
ASIA
Peking
JAPAN
Tokio
CHINA
PACIFIC OCEAN
San Francisco
UNITED STATES
New York
ATLANTIC OCEAN
BERMUDAS
BAHAMAS
Havana
TURKS IS.
JAMAICA
LEEWARD IS.
WINDWARD IS.
BARBADOS
TRINIDAD
Panama
BRITISH GUIANA
BRITISH HONDURAS
GIBRALTAR
MALTA
CYPRUS
SUEZ
CAIRO
EGYPT
BAHREIN IS.
SOKOTRA
ADEN
KAMARAN
PERIM
SOMALI LAND
ZANZIBAR
SEYCHELLES
AMIRANTE IS.
ALDABRA IS.
CARGADOS IS.
MALDIVE IS.
LACCADIVE IS.
CEYLON
ANDAMAN IS.
NICOBAR IS.
SIKKIM
ASSAM
BOMBAY
MURIA IS.
KATHIA WAR
INDIA
STRAITS SETTLEMENTS
SINGAPORE
LABUAN
SARAWAK
NORTH BORNEO
PHILIPPINE ISLANDS
HONGKONG
WEI-HAI-WEI
GILBERT IS.
NEW GUINEA
SOLOMON IS.
ELLICE IS.
SANTA CRUZ IS.
ROTUMAH
FIJI IS.
LOUISIADE ARCH.
NEW HEBRIDES
CHRISTMAS I.
COCOS IS.
INDIAN OCEAN
AUSTRALIA
NORFOLK I.
LORD HOWE
SYDNEY
MELBOURNE
NEW ZEALAND
TASMANIA
BOUNTY IS.
STEWART I.
ANTIPODES IS.
AUCKLAND I.
ROYAL COMPANY IS.
CAMPBELL I.
MACQUARIE I.
EMERALD I.
SIERRA LEONE
GOLD COAST
GAMBIA
SENEGAL
NIGER TERRITORIES
LAGOS
ASCENSION I.
ST. HELENA
BRITISH CENTRAL AFRICA
BECHUANA LAND
GERMAN EAST AFRICA
ORANGE RIVER COLONY
TRANSVAAL COLONY
NATAL
CAPE COLONY
WALFISCH BAY
ICHABOE I.
C. OF GOOD HOPE
TRISTAN DA CUNHA
ROBRIGUEZ I.
MAURITIUS
SOUTH AMERICA
Rio Janeiro
Valparaiso
Buenos Ayres
C. Horn
FALKLAND IS
SOUTH GEORGIA
PALMYRA I.
JOHNSTON I.
WASHINGTON I.
FANNING I.
CHRISTMAS I.
PHOENIX IS.
TONGA OR FRIENDLY IS.
KERMADEC IS.
CHATHAM IS.
PITCAIRN I.
DUCIE I.
HERVEY OR COOK IS.
PALMERSTON I.
Scale along the Equator.
0 1000 2000 5000
Statute Miles.
THE N.-N. CO.
Longitude West from Greenwich
Longitude East from Greenwich

FIG. 312.

FIG. 313.

MAP QUESTIONS. — (1) Walk toward the British Isles. (2) What two large islands do they include? (3) What waters separate these two? (4) Name the three divisions of Great Britain. (5) Find the Orkney, Hebrides, Shetland, and Channel Islands. They are included among the British Isles. (6) What sea lies east of Great Britain? (7) What country is nearest to Great Britain? (Fig. 352.) (8) What waters separate the two? (9) Make a sketch map of the British Isles. (10) Compare the coast line with that of Spain (Fig. 337). With that of Norway (Fig. 352). What suggestion do you get from this comparison?

islands have been invaded by many hardy people, among them the *Angles* and *Saxons*, from whom the words *English* and *Anglo-Saxon* have been derived. The *Normans* also entered Britain, and still earlier the Romans under Julius Cæsar.

Although formerly divided into different nations, England, Scotland, and Ireland are now united to form the *United Kingdom* of Great Britain and Ireland. The inhabitants of each of these sections are noted for their energy, intelligence, and high ideals, which in no small measure account for their success as a nation.

Physiography and Climate. — The southwesterly winds from over the warm ocean (p. 321) also partly account for the greatness of the British Empire. Two days out of three these winds blow across the British Isles; and, since they have traversed a vast expanse of warm water, they greatly temper the climate. Indeed, the winter season is milder than that in northern United States, and the summer is cooler (Figs. 268 and 269).

The prevailing westerlies, carrying an abundance of moisture (p. 321), so distribute it over the islands that no section suffers from drought. Yet the western portions receive more rain than the eastern, because the ocean winds visit them first (Fig. 314).

The highlands also influence the rainfall. A highland rim extends around Ireland (Fig. 313), giving to the surface of that island the form of a shallow plate. How does that influence the rainfall? (Fig. 314.) Highlands are also found in Wales, western England, and most of Scotland (Fig. 313).

As already stated (p. 317) the mountains of Great Britain, like those of New England, are so old that they are worn very low. While this upland is rarely more than one or two thousand feet above sea level, there are occasional peaks of hard rock that rise to a greater height. For example, the granite peak of Ben Nevis in Scotland, the highest point in the British Isles, is forty-three hundred feet in elevation. The Scottish Highlands (Fig. 315) are so rugged and barren that few people are able to live there.

Where the rocks are soft and easily worn away by water there are lower and more level tracts, or plains. Point out the broadest plains of Ireland, Scotland, and England (Fig. 313).

The coast line is very irregular, as may be seen from the map. (Fig. 313.) How does the coast compare with that of New England? You have already learned that this irregularity is due to sinking of the land; and that the many islands are the crests of

former hills, while the bays and harbors are submerged valleys. Since the mountainous western portion had more deep valleys for the sea to enter than the level plains of the east, there are more good harbors on the west coast than on the eastern side of the islands. On both sides, however, the mouths of the larger rivers usually make good ports. Why?

Agriculture. — In connection with agriculture, much live stock is raised. In fact, grazing has of late so increased in importance that there is now twice as much land in pasture as in crops, and the British Isles are noted for their great number of fine cattle, sheep, and horses. The importance of grazing is partly explained by the fact that much of the surface, like that of New England, is too rocky or mountainous to be cultivated (Fig. 315). Besides this, some of the plains in eastern England, although too sterile for farming, make excellent pasture land. Two other facts favorable to stock raising are the mild winters and the damp atmosphere, which encourage the growth of grass. In addition to these causes, the cheapness with which grain is raised in other countries, like the United States, and transported to the British Isles on the larger steamships, has made it less necessary for the British to raise grain.

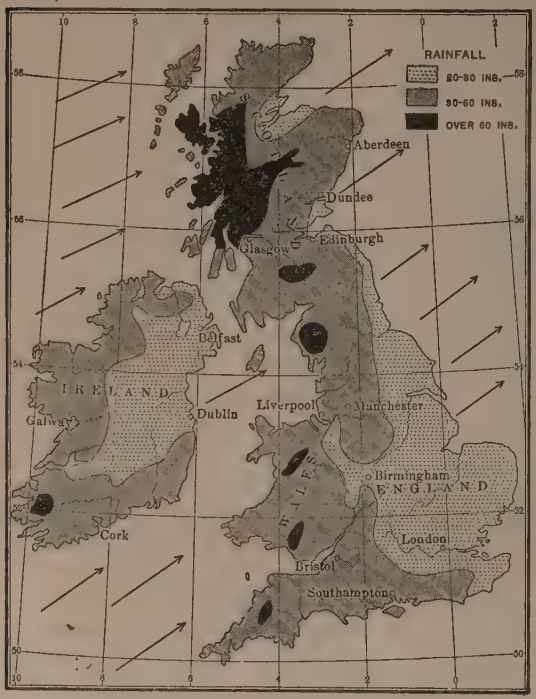


FIG. 314.

Rainfall map of the British Isles.

Several of the smaller islands also are celebrated for their live stock. For instance, the Shetlands are famous for Shetland ponies; and on the three Channel Islands, — Jersey, Guernsey, and Alderney,

— near the French coast, three breeds of cattle have been developed which are well known in the United States.

The cool summer climate, which is of advantage in some respects, is unfavorable to many kinds of farming; for example, it prevents the production of corn, cotton, tobacco, and grapes, which require warm summers. More hardy products, however, as oats, barley, and wheat, are extensively cultivated. Turnips, potatoes, beans, and peas are other important crops; also hops, which, together with barley, are used in the manufacture of beer. Owing to the many towns and cities, truck farming is of importance.

The demand for farm land has been so great that large areas of swamp have been reclaimed by careful drainage, and these now make the most fertile farms. But in spite of the care that has been given to cultivating the soil and to raising live stock, far less food is produced than is needed by the inhabitants. Such vast multitudes are engaged in other occupations that if they were deprived of food from abroad, they would, it is

FIG. 315.

Pasture land in the Highlands of Scotland.

said, begin to suffer from famine within a month. How different that is from our own country, of which the area is so large, and climate so varied, that it not only supplies the food we need, but produces enormous quantities to be sent abroad.

Fishing. — Since the early inhabitants had to cross the sea in order to reach these islands, and since most of their descendants have lived either

on or near the coast, it is natural that, as a people, they should become accustomed to a seafaring life. This sort of life has also been encouraged by the fact that food fish abound on the shallow banks of the North Sea and of the ocean to the north and west of the islands. More than one hundred thousand men and twenty-five thousand boats from the British Isles are employed in the fishing industry. Among the fish caught are

FIG. 316.

A cottage in southwestern England.

cod, haddock, and herring, as off the coast of New England and Newfoundland. Another important kind is a flat-fish, the sole, which resembles the flounder of the New England coast. Salmon enter the rivers of northern Great Britain, and oysters are found along the southern coast.

Many fishing hamlets are scattered along the shore; but the fishing industry here, as in New England, is becoming more and more centralized in the large towns, which possess the capital for large vessels and expensive fishing outfits. The chief centers of the trade, like Boston and Gloucester in Massachusetts, are LONDON, HULL, and GRIMSBY (Fig. 322), in England, and ABERDEEN in Scotland.

Mining. — One of the resources of the British Isles which early attracted people from southern Europe was the tin in southwestern England. This metal is not mined in many parts of the world, but has always been in great demand; and even before the time of Cæsar, ships from the Mediterranean came to England to obtain tin for use in the manufacture of bronze. Small quantities of copper, lead, zinc, and even gold and silver ores have also been discovered in the British Isles, but at present there is almost no mining of these metals.

On the other hand, the abundance of two other minerals, coal and iron ore, reminds us of our own country. This one small island of Great Britain produces almost as much coal as all of our states together; and the United States and Great Britain are the leading coal-producing countries of the world. Figure 317 shows the sections of Great Britain in which coal is found. While most of the coal is bituminous, that in South Wales is mainly anthracite. Large numbers of miners in the United States are Welshmen who have come from that section.

Parts of Great Britain possess the same advantage as Birmingham, Alabama, the name of which is derived from the close resemblance of conditions about it to those about Birmingham, England. None of the British iron ore is far from coal; and in places the same shaft is used to bring both coal and iron to the surface. Limestone is also abundant and near at hand. What suggestions do these facts give concerning the development of manufactures and the location of large cities?

FIG. 317.

A map showing the coal fields of the British Isles. Why are so many of the large cities on or near the coal fields?

Besides these minerals, various building stones are extensively quarried, as granite in Scotland, and slate in northern Wales. Salt is also found; and there is clay of such excellent quality for earthenware that several towns have become noted for their potteries, as Trenton and Cincinnati have in the United States. The extent of the mining industry in the United Kingdom is indicated by the fact that there more than half a million persons are employed underground.

Reasons for Development of Manufacturing. — Considering the abundance of coal and iron ore on the one hand, and of wool from

the millions of sheep on the other, it is clear that Great Britain is able to manufacture extensively. Even in very early times the English were engaged in the weaving of woolen cloth. Later, owing to numerous wars and to the oppression from rulers on the continent, England became a refuge for oppressed industrial people from the mainland, so that such manufacturing rapidly increased.

As in New England, the hilly sections have abundant water power due to the former glacier, and this also favored manufacturing. Later, when steam was employed, the abundant stores of coal were of

FIG. 318.

A castle in Wales, situated on one of the hills of hard rock.

great importance. The use of steam has led to the building of many factories, and to the growth of manufacturing centers. Therefore, the making of cloth on hand looms at the homes of the weavers has been generally abandoned.

The peculiar energy and inventive genius of the British, which kept their machinery in advance of that used by other nations, must also be considered. For example, it was the Scotchman, James Watt, who invented the modern steam engine; and it was George Stephenson who invented the first locomotive. The very smallness of the country is

another advantage; for no matter where a factory may be located, it is near the coal fields and within a few miles of a shipping point.

Woolen and Cotton Manufactures. — In the mountainous section of northern England, near both coal and wool, are hundreds of factories engaged in the manufacture of woolen cloth. The principal center of this trade is LEEDS, which has the added advantage of water power. On the western side of this hilly region is BRADFORD, noted for its broadcloth and worsted goods; and neighboring cities manufacture woolen yarn, hosiery, carpets, and blankets. The woolen industry extends northward into Scotland and southward to LEICESTER, where the surrounding plains produce a breed of sheep that yields a wool for worsted yarn.

From the spinning and weaving of wool it was easy to move to cotton manufacturing; and on the western side of the northern mountains we find a great cotton-manufacturing industry. Dampness is one of the points in favor of that section, for in a dry air cotton is in danger of becoming too brittle to spin and weave easily. Another reason why this work is best developed on the west side of the island is the fact that it is nearer to the United States, from which so much of the raw cotton comes.

The center of the cotton manufacturing is MANCHESTER. What cities do you find situated near by? This portion of Great Britain, including southern Scotland and the two sides of the mountain range of northern England, is the seat of the greatest textile industry in the world. Can you name cities of New England which are likewise engaged in cotton and woolen manufacture?

In spite of the enormous number of sheep in the British Isles, the manufacturing industry has so far outgrown the local supply of wool that millions of pounds must be imported every year. This condition resembles that of New England, where much of the wool is brought from Ohio, and more western states, as well as from foreign countries. As to cotton, since the British climate will not permit its cultivation, it is necessary to import about two billion pounds a year to supply the mills. Although much cotton is now obtained from Egypt, India, and other parts of the British Empire, our Southern States still supply the greatest quantity.

Iron and Steel Manufacturing. — The cities in Great Britain that are most noted for iron and steel products are BIRMINGHAM and SHEFFIELD in England, and GLASGOW in Scotland. BIRMINGHAM manufactures jewelry, watches, firearms, bicycles, steam engines, etc.

SHEFFIELD has for centuries been distinguished for cutlery, the existence of grindstone quarries in the neighborhood being a partial reason for this particular industry. Why? It also manufactures steel rails and armor plates for warships. GLASGOW is a center for shipbuilding and for the manufacture of locomotives and machinery of various kinds.

In cities round about these places are similar works; and as in New England, many of those occupied with the textile industry also produce textile machinery and other iron and steel goods. The island is so small that coal and iron are cheaply shipped to various points; and on this account, manufacturing, though best developed near the coal fields, is not confined to these districts.

Thus we see that here, as in the United States, coal makes possible an enormous industrial development. But in spite of the forest of chimneys in England and southern Scotland, the output of coal is

FIG. 319.

The Clyde, at Glasgow. Fifty years ago the river could be forded at this place, but it has been deepened by dredging so that the largest vessels now enter.

more than sufficient to meet the demands. The materials to be manufactured, however, are not sufficient; for all the cotton, much of the wool, and part of the iron ore must be imported.

These three industries, connected with cotton, wool, and iron, have made Great Britain one of the great workshops of the world. The most important is cotton manufacturing; iron ranks next, and wool is third.

Ireland. — Ireland forms a striking contrast to Great Britain in several respects. In the first place, it is mainly a country of farms

instead of manufactures. The mild climate and damp atmosphere insure excellent grass throughout the year, and about four fifths of the farm land is in pasture. It follows, therefore, that great numbers of cattle, sheep, and horses are raised. As in Great Britain, the principal grain is oats; but barley, wheat, potatoes, and turnips are also raised.

Again, unlike Great Britain, Ireland is very barren of minerals. Building stones, such as granite, marble, and sandstone, are found, but there is extremely little coal or iron. For that reason, whatever manufacturing has been developed is found chiefly on the eastern side, where coal is easily obtained from England or Scotland. At one point the two islands are only thirteen miles apart.

The lack of coal for use in the homes is partly made up by the abundance of "turf" or peat. Owing to the deposits of glacial drift, which have obstructed the streams (Fig. 320), the level interior is so poorly

FIG. 320.

The famous Lakes of Killarney in the hilly part of southwestern Ireland. They are formed where glacial drift has obstructed the drainage.

drained that marshes or bogs occupy about one twelfth of the entire surface of the island. The water in these bogs protects the swamp vegetation from decay, so that it accumulates, forming a sod, which, when dug up and dried, makes a fairly good fuel. It will be remembered that similar deposits, in the larger swamps of the Coal Period, caused the coal beds which are now of so much value (p. 4).

While manufacturing is little developed, there is one kind that flourishes in Ireland; namely, the making of *linen*. The Irish linens,

which take high rank in our country, are made from the inner bark of the flax plant. Flax is grown in various parts of the United States, but mainly for the sake of the seed, from which linseed oil is made. This oil is used in mixing paints and in making varnish. In Ireland, however, flax is raised chiefly for its fiber.

The damp climate of Ireland is favorable to the growth of flax, and the cheap labor makes possible the great amount of care required in preparing it for the manufacture of linen. The stem of flax is tall and slender, and a field of it presents somewhat the same appearance as a field of oats. Instead of being cut, like grain, it is pulled up and left lying upon the ground for some time, exposed to the dew and weather, so that the gummy substance, which holds the woody matter and fiber together, may decay. After the fiber has been separated from the woody core by machinery, it is split and combed out with a steel brush and thus made ready for spinning.

Travelers in northern Ireland in summer see field after field covered with flax, which is used chiefly in linen factories at BELFAST. The fiber is made into thread in much the same manner as cotton or wool, and this is then woven into napkins, tablecloths, etc. Name other articles made of linen.

Ireland forms a contrast to Great Britain in regard to population. Not only is it far less densely peopled, but the number of inhabitants is decreasing. Partly because of the unfavorable laws imposed by England, the Irish have long been discontented with their lot; and since the disastrous potato famine in 1847, they have been abandoning the country. They have sought refuge chiefly in America, and since the date mentioned, the number of inhabitants has been reduced from 8,000,000 to 5,000,000.

Location of Principal Cities. — The cities most distinguished for manufacturing have already been mentioned; namely, LEEDS, BRADFORD, MANCHESTER, SHEFFIELD, BIRMINGHAM, and GLASGOW. What industries are developed in each?

There are other large cities along the coast; for so much manufacturing calls for an enormous import of raw materials and food, as well as the export of manufactured goods. These cities must, therefore, be the gateways to and from the island. And since Great Britain lies rather far north, between Europe and the New World, these shipping points must be located on the eastern, western, and southern sides, at those points where the best harbors exist, and not far from the great industrial centers.

First among the coastal cities to be noted is LONDON, with BRISTOL opposite it on the west. Farther north is HULL, with LIVERPOOL on the opposite side; and in southern Scotland is EDINBURGH, near the coast, paired with GLASGOW on the west. On the south side the two most important ports are SOUTHAMP-

TON and PORTSMOUTH. What are the principal cities of Ireland? Steamships, railway lines, and canals connect the various cities, carrying immense quantities of freight. In Great Britain and Ireland there are nearly four thousand miles of canal and over twenty-one thousand miles of railway.

London. — This city, the largest in the world, is situated on the Thames River. The Thames, like many other British rivers, has a wide, deep mouth, owing to the sinking of the land, and London is located as far inland as high tide allows vessels to go, or fifty miles from the open sea. The advantage of this position lies in the fact that it is in the interior of the island, yet has direct water communication with foreign countries.

As in all great cities, one of the principal industries is manufacturing, nearly all kinds of goods being made, as in New York,

FIG. 321.

Commerce on the Thames below London Bridge.

Chicago, and Philadelphia. But New York, we know, owes its greatness largely to the fact that it is the gateway to a vast productive interior, while almost any point in England may be reached by rail from London in a few hours. Nevertheless, although Great Britain is small, its population is nearly one half as great as that of the United States, and the port of London is the point of entrance for much of its food.

FIG. 322.

The location of London and of Liverpool.

In fact, this is the greatest shipping point in the world. Its rows of piers extend twenty miles down the river, and its railways radiate in all directions (Fig. 322). However, the fact that London lacks coal and iron near at hand, places it at some disadvantage compared with Liverpool and Glasgow.

Besides being the capital of the *British Empire* (Fig. 312), which is the name applied to the United Kingdom and its dependencies, London is the center for the publication of books and magazines, and is provided with noted picture galleries, libraries, museums, and

FIG. 323.

Windsor Castle.

many magnificent buildings. Its wealth and trade are so extensive that it has been the money center of the world, though New York, the money center of the United States, now rivals it. The leading bank, called the Bank of England, is the agent of the government in many of its business transactions, and employs about a thousand persons.

London being a very old city, many of the streets are narrow and crooked. Some of the principal streets are too narrow for street cars, so that, unlike American cities, the people have to be transported mainly by omnibuses. One of the largest companies runs thirteen hundred busses, and employs five thousand men and fifteen thousand horses. However, underground railways which encircle the great city, running under houses and streets, carry an enormous number of passengers.

Near London are many places of interest. Just below the city, on the south side of the river, is the Greenwich observatory (p. 42), from which meridians of longitude are numbered and time is regulated. A few miles up the river is Windsor Castle (Fig. 323), the palace of the sovereigns of the Empire. Find CAMBRIDGE and OXFORD (Fig. 322), the two leading university towns of Great Britain.

Other English Cities.— Southwest of London, on the coast, is SOUTHAMPTON, where ocean steamers from the United States often stop (Fig. 327), and where fast trains wait to convey passengers to the metropolis. Close to Southampton is PORTSMOUTH, which has a great navy yard.

Almost due west of London, at the mouth of the Severn River, is BRISTOL, which is engaged in the lumber trade and in the manufacture of tobacco and chocolate. It was formerly next to London in size, but Liverpool has now far outstripped it. Can you suggest some reason why? Just west of Bristol is CARDIFF in Wales, the chief point in Great Britain for the export of coal.

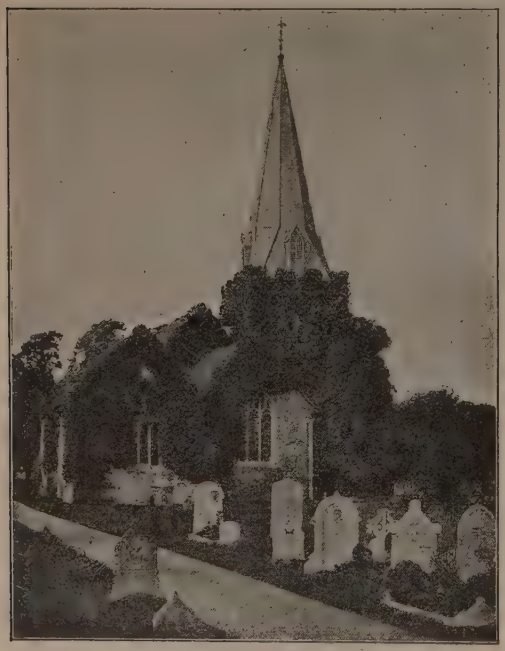


FIG. 324.

The churchyard described in Gray's "Elegy."

Knowing the occupation of the dense population in northern England, we can tell the principal exports of HULL and LIVERPOOL. What must they be? The former city naturally trades mainly with Europe, and the latter with the Americas and West Africa.

Before the discovery of the New World, the west side of Great Britain had little commerce, and LIVERPOOL (Fig. 322), therefore, had little business or growth. But with the settlement of America the city grew until it now has an immense trade with North and South America, and is the third in size in the United Kingdom.

Many passengers from America land at this port and go by rail to London. Besides its commerce, Liverpool is also important for its shipbuilding. What circumstances are favorable to that industry? A

FIG. 325.

Kenilworth Castle, described by Scott in "Kenilworth."

ship canal, about thirty-five miles in length, has recently been built to MANCHESTER at an expense of $75,000,000.

Cities of Scotland. — GLASGOW (Fig. 319), on the western side of the lowland plain of southern Scotland, is not only a great manufacturing center, but it is also a leading shipping point for the same reasons that Liverpool is. State them. What must be some of its principal imports and exports? Why?

EDINBURGH, unlike the other great cities named, is neither a shipping point nor an important manufacturing center. It is distinguished as the capital of Scotland, and as one of the most beautiful cities

FIG. 326.

Shakespeare's house at Stratford-on-Avon. Since this picture was taken, the house has been somewhat changed in appearance.

of the British Isles. Its importance is historical rather than commercial; for in the early days it commanded the entrance to the lowland of southern Scotland. The well-known University of Edinburgh is situated here. LEITH, a short distance away, is the port for Edinburgh.

Farther north on the coast are the important ports of DUNDEE and ABERDEEN (p. 330). The former sends forth a number of Arctic whaling vessels each year, and is also engaged in the manufacture of linen.

Cities of Ireland.—The principal cities of Ireland are on the east and south sides. Why? What has already been said about BELFAST? (p. 336.) It is also noted for its shipbuilding. DUBLIN, the capital and largest city, and the chief port for the English trade, ships farm and other products to England and receives manufactured goods in return. QUEENSTOWN has a fine harbor, and is a port of call for vessels bound from America to Great Britain.

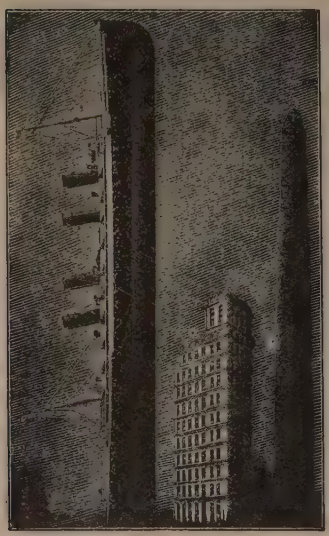


FIG. 327.

A large German steamship which stops at Southampton; to show its great size in comparison with a high building in New York City and with the Washington Monument (555 feet high). The length of this steamer is 648 feet, its width 66, and its depth 43 feet.

Fuller Reasons for the Greatness of the British Empire.—While we have learned many facts about the British Isles, some important questions are not yet fully answered. For example, why does this little country possess more colonies (Fig. 312) than any other nation of the earth? Further, why should it have the greatest foreign trade? And why the greatest number of vessels upon the sea?

Some of the reasons in answer to these questions are as follows. The fact that Great Britain is so small — it is impossible to find a point more than seventy miles from the salt water — is a reason why many of the British have been sailors. It is not surprising, therefore, that they have produced many explorers.

Nor is it to be wondered at that, as these explorers discovered new parts of the world, they laid claim to them in the name of their

mother country. In this way, and by war, Great Britain came into possession of the Thirteen Colonies of North America, and of Canada, India, Australia, much of Africa, and many other places (Fig. 312). At present her territory includes about one fifth of the land surface of the globe and one fourth of its inhabitants.

These colonies and dependencies help to explain Great Britain's enormous foreign commerce; for the colonies have found it more advantageous to trade with the mother country than with other nations speaking a different language and having less understanding of them or sympathy with them. They sell to her their raw products, including food, and she in return sends to them clothing, steel goods,

FIG. 328.

The Houses of Parliament.

and other manufactured articles. It is largely the exchange of goods with these colonies that has made the foreign trade of Great Britain nearly twice that of any other nation. Next to her colonies Great Britain's greatest trade is with the United States.

Some of the reasons why this little island should own more vessels than any other nation have already appeared. In fishing, exploring, and making settlements, a large number of ships have been needed; and for the proper defense of her widely distributed colonies many warships have been required. Another reason for so large a navy is the fact that the British Isles are cut off from all

other nations by water. They must, therefore, rely rather upon warships for defense than upon a standing army.

Further than this, the British are actually forced to own many ships. Here are over forty million people living on two small islands, from the soil of which it is impossible to obtain the necessary food. They must send ships away for their flour, meat, sugar, coffee, etc.; and they must send abroad for much of their raw material for manufacture. Also, in order to pay for the raw materials and food, their manufactured goods must be shipped to all parts of the world; otherwise their extensive manufacturing would be impossible.

These facts, coupled with the remarkable energy of the British, are the principal reasons why the United Kingdom greatly surpasses all other nations in the number of her warships and merchant vessels.

Government. — The government of the United Kingdom is a limited monarchy, the present ruler being King Edward VII. We know that in the United States our general laws are made at Washington by a Congress composed of a Senate and a House of Representatives. In the United Kingdom the law-making body corresponding to this is called *Parliament*. It is likewise composed of two bodies, the House of Lords and the House of Commons.

The *House of Lords* is made up of men with inherited titles who are not elected by the people. In former times the Lords were so powerful that the people had little control of the government; but for many generations their power has been restricted, and the *House of Commons*, whose members are elected by popular vote, is now by far the more important. Through them the people are able to make their own laws, and the government is therefore one of great freedom.

While the sovereign is nominally the executive, like our President, the execution of laws is really in charge of a *Cabinet* composed of a *Prime Minister* and several other *Ministers*, who are responsible to the House of Commons for their actions. If the Ministers lose the support of the House, they are obliged to resign; and then others are appointed who will carry out the wishes of the people.

Review Questions. — (1) Give the location and area of the British Isles. (2) What noteworthy facts about their importance? (3) What about the inhabitants? (4) Tell about their climate. (5) Their physiography. (6) The effects of the ice sheet. (7) The coast line. (8) Why is so much of the land in grass? (9) Tell about the live stock. (10) What crops cannot be raised? Why? (11) What are the principal farm products? (12) What disadvantage do the people suffer in regard to food supply? (13) Give the principal facts about the fishing industry. (14) What metals are found in small quantities? (15) How

about the abundance of coal and iron ore? (16) Locate the chief coal fields in Great Britain. (17) Tell about the iron ore in Great Britain. (18) Name other important mineral products. (19) Give reasons for the development of textile manufacturing in Great Britain. (20) What cities are especially noted for the manufacture of woolen goods? (21) For cotton? (22) Tell about the manufacture of iron and steel goods. (23) What about the farm products of Ireland? What about minerals there? (24) About manufacturing? (25) What is used for fuel? (26) Tell about the linen industry of Ireland. (27) About the population. (28) Name and locate the cities in Great Britain that are distinguished for manufacturing. (29) Name and locate the principal coast cities. (30) Tell about London: its location, principal kinds of business, etc. (31) What noted places are near by? (32) Tell about each of the other cities mentioned. Locate each. (33) Give some reasons why the British Isles have more colonies than any other country. (34) Why more foreign trade? (35) Why the greatest number of vessels? (36) Tell about their government.

SUGGESTIONS. — (1) On a sketch map of Great Britain mark the position of the highlands and lowlands. (2) Considering the prevailing winds, which side of the great cities must be most free from smoke? (3) Why are sheep able to eat shorter grass than cattle? (4) Make a list of goods made out of flax, and place samples in the school cabinet. (5) Write a paper telling in what ways the people of the British Isles and the United States depend on one another. (6) State ways in which New England and Great Britain resemble each other. (7) What names of British cities have you met in your study of the United States? In what portion of the United States are they? (8) Collect pictures of scenes in the British Isles. (9) What books have you read which describe the scenery or the people of these islands? (10) Find out other facts about the large steamships. (11) What advantages do you see in the fact that the British Isles are near the continent, yet separated by water? (12) Read in George Eliot's "Silas Marner" for a description of old-fashioned manufacturing by hand looms. (13) Also in "John Halifax, Gentleman," for an account of the introduction of steam into the factories. (14) Read Gray's "Elegy Written in a Country Churchyard." (15) Read Scott's "Kenilworth." (16) Find out some facts about Queen Victoria. (17) What do you know about Shakespeare?

For REFERENCES to books and articles, see *Teacher's Book*.

III. THE NETHERLANDS AND BELGIUM

MAP QUESTIONS (Fig. 337). — (1) Compare the area of the Netherlands with that of Belgium; with that of Great Britain. (2) Compare the coast lines of the Netherlands and Belgium. (3) What large river crosses the Netherlands? Through what countries does it pass? (4) What countries border the Netherlands? (5) Belgium? (6) Make an outline map of these two countries.

THE NETHERLANDS (HOLLAND)

Physiography. — Figure 329 shows the Netherlands to be a peculiar country. The greater portion is very low, and some parts are as much as fifteen feet below sea level. In fact, if protection against sea and river were not provided, about one half of the surface would be occasionally or permanently under water. This explains why the country, sometimes called Holland, is more commonly known as the Netherlands, a word meaning *low country*.

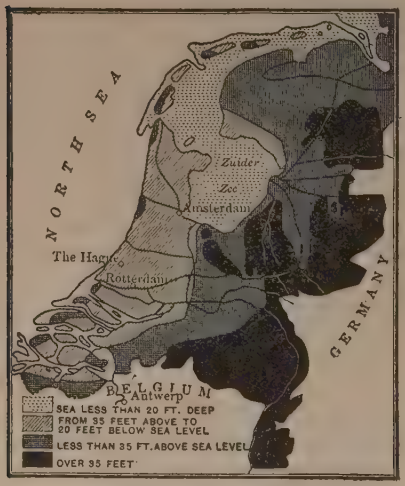


FIG. 329.

Map to show the portion of the Netherlands that is below sea level.

The Rhine has brought much of the soil; some of it, no doubt, all the way from the Alps. A large part of the country is, in fact, a delta of sand and clay built by the Rhine, and it is so low and level that over much of the surface the only notable elevations are either sand dunes, thrown up by the wind, or glacial moraines of sand and gravel. In Figure 306 notice how far the ice sheet advanced in this section. Hard rocks are found only in the eastern and southeastern parts, where the highest point is a little over a thousand feet.

In so level a country there can be little water power; and little mineral wealth may be expected in the soft clays and sands. Some iron is found in the bogs, which are extensive, and a small amount

of coal is mined in the extreme southeast. Under the circumstances, is there promise of much manufacturing?

Owing to all these disadvantages the Netherlands might seem to be incapable of supporting a large population. Nevertheless, that country has about two thirds as many inhabitants as the remarkably productive state of New York, which is four times as large.

People and Government. — Perhaps the leading explanation of this prosperity is the high character of the *Dutch* people, as the Netherlanders are called. For centuries they have felt an intense love for civil and religious liberty; but, being a small nation, they have suffered many hardships in attempting to establish independence and

FIG. 330.

A farm scene on the plains of Holland.

tolerant laws. At one time they were under German control; later they came under the cruel rule of Spain; but finally they obtained their independence, and their form of government is now a limited monarchy.

While their belief in freedom brought them untold suffering, it was a cause of progress as well. It was to Holland that the Pilgrims first fled when religious persecutions drove them from England; and from time to time large numbers of Huguenots, Germans, and others found refuge there. Their settlement in the Netherlands had a great influence on the intelligence with which Dutch industries were developed.

Agriculture. — Agriculture, including grazing, is the principal industry of the kingdom, although, largely on account of swamps

and sand dunes, a fifth of its area is waste land. The principal farm products are grains, such as rye, oats, wheat, barley, and buckwheat; also potatoes, sugar beets, beans, peas, and flax. More land is devoted to pasturage (Fig. 330) than to these crops, partly because much of the higher land is too sandy for cultivation, and partly because the moisture in the lowlands aids in the growth of excellent grass. Cattle, hogs, sheep, and horses are raised in great numbers; and quantities of butter and cheese are made.

Fig. 331.

A Dutch windmill.

There is, of course, good reason why the Dutch have been willing to endure the labor and danger involved in reclaiming large tracts of land from the sea. As the population increased, and the need of new farm land grew, it was found possible to keep the high tides and rivers from overflowing the salt marshes and flood plains. In this way the people have added large areas of fertile land, and have also been encouraged to undertake the even more difficult task of reclaiming the shallow sea-bottom.

Such drainage began in the twelfth century and has continued until the present day. It has already about doubled the area of the Netherlands, and now a scheme is under way to reclaim the Zuider Zee itself (Fig. 329).

The ditches for draining the land really form canals, which, by means of their embankments, inclose houses, gardens, and fields, much as fences or stone walls inclose houses and gardens in other countries. They are so numerous that they extend over the lowlands in a great network.

Manufacturing. — Although there is very little coal or water power in the kingdom, there is an abundance of coal near by in Belgium, Germany, and England. Accordingly, since the people require quantities of cloth, shoes, machinery, etc., they import coal and many necessary raw materials in order to manufacture for themselves. The strangers who fled to the Netherlands to escape

persecution did much toward developing early manufacturing, and this industry now ranks next in importance to agriculture.

Commerce. — Commerce is highly developed for several reasons. In the first place, the ditches, built primarily for purposes of drainage, are also valuable as canals; and these, together with the rivers, make transportation by water very easy to all sections of the country. The flat-topped dikes also make excellent wagon roads; and the level nature of the land renders the construction of tramways and railways a simple matter. Many of the railways connect directly with the European trunk lines.

In the second place, the *position of Holland* gives her a distinct commercial advantage. The Netherlands lie directly in the path of

FIG. 332.

A canal in Amsterdam. Notice the peculiar fronts of the Dutch houses.

entrance to northern Europe, and the country is crossed by the Rhine River, which is navigable for a long distance into Germany. Therefore much of the American and British trade with central Europe is carried on through Holland.

Colonies. — The Dutch colonies (Fig. 354) furnish a third reason for an extensive development of commerce. Since the very earliest times the Dutch have been in close contact with the salt water. Not only have they battled with the sea in reclaiming land, but to visit some of their near

neighbors they have been obliged to cross it. Moreover, both the Zuider Zee and the North Sea, near at hand, contain many food fish; and this fact has led to development of the fisheries, one of the leading industries of the country.

The men have therefore become expert sailors; and when discoveries of new lands were made, the Dutch sailors naturally shared in the explorations and established colonies.

The attempt of the Dutch to colonize our Hudson valley was thwarted by the English; but Holland retains possession of other important regions. Of these, Dutch Guiana in South America has already been mentioned (p. 300); but the most important are Java and several other East India islands. The manufacture of raw products from the colonies constitutes one of the principal industries of the coast cities.

The possession of these colonies, Holland's location, her water and rail connections with other countries, and her many canals and excellent roads, make the transportation of goods an important industry.

Cities. — AMSTERDAM and ROTTERDAM are the two principal commercial centers. The former, the largest city in the Netherlands, is about the size of Baltimore. It is connected with the ocean by canal, and is noted for its university and museums, as well as its shipping, manufacturing, and diamond cutting. The rulers of Holland are crowned at Amsterdam, the capital, although the royal family resides at THE HAGUE, where the government buildings are situated.

ROTTERDAM, next to Amsterdam in size, is the great seaport of the Netherlands. Its location near the mouth of the Rhine makes it one of the principal ports for the interior of the continent, and explains why it is the European terminus for some of the great steamship lines from New York and other parts of the world.

BELGIUM

Physiography. —The surface of Belgium forcibly recalls that of Holland. The land is low and flat in the northern and western parts, and gradually rises and grows more rolling toward the south and east.

However, the highest point in Belgium (2230 feet) is more than twice that in the Netherlands. Instead of being caused by glacial moraines and sand dunes, this highland is a mountainous region, formed by upheaval of the earth's crust (Fig. 333). The weathering of ages, which has worn these mountains so low, has revealed valuable mineral deposits, especially coal and iron, which fortunately occur near together, as in England. Lead, zinc, and silver are also obtained.

Belgium, therefore, possesses agricultural advantages similar to those of Holland, while the minerals secure opportunities for manufacturing far superior to those of the Dutch. These facts help to explain why, although Belgium is even smaller than Holland, its population is one fourth larger, or about 6,500,000. How does that compare with the population of New York state? Indeed, the small country of Belgium is one of the most densely populated regions on the earth. Figure out the number of inhabitants per square mile and compare it with the number in New York, or in your own state.

People and Government. — Like the Dutch, the Belgians have endured untold sufferings in their long struggle for independence. Their country has been, to some extent, a battlefield for the larger countries or *powers* of Europe; for example, the *battle of Waterloo*,

FIG. 333.

A view in the hilly section of southern Belgium.

by which the career of Napoleon Bonaparte was ended, was fought there in 1815. Since 1830, however, the Belgians have been independent. Their form of government is a limited monarchy.

The intelligence of the Belgians is of the highest order. Even during the Middle Ages their woolen manufactures were the best developed in Europe, and at various times the kings of England have induced Belgian

artisans to move to England for the purpose of improving the factory work. Since the great nations of Europe have declared Belgium neutral territory, thus prohibiting further fighting there, the people have found it necessary to keep only a small standing army, and have devoted themselves to the industries. As a result, Belgium has enjoyed a wonderful industrial growth.

Agriculture.— A very small part of Belgium is below sea level; but, as in the Netherlands, much of the country is so flat and fertile that a view on the Belgian plain would closely resemble that in Figure 330. More than half the inhabitants are engaged in agriculture, the chief products, besides live stock, being grain, flax, hemp, fruit, and sugar beets. Among the farm animals, the Flemish[1] horses are especially noted for their great size and strength.

The Belgian method of farming forms a striking contrast to that in the United States; for instead of ranging from one hundred to several thousand acres, farms in Belgium usually contain not more than two or three acres. To a large extent, spading takes the place of plowing, and such hand labor, guided by the experience of many generations, secures large yields of the best quality. Flemish flax is the best in the world. In spite of such careful cultivation of the soil much food has to be imported, as in Great Britain.

Fig. 334.

A dog team in Belgium.

Mining and Manufacturing.— Quite distinct from the level northern plain, close set with farms and towns, is the hilly region of the southern angle, covered with forests and rich in minerals. More than one hundred thousand men are engaged in mining, and coal and coke are among the leading exports. Around the northwest slope of the hilly region is located one of the world's busiest industrial regions. As in England, the three important kinds of manufacturing are cotton, wool, and iron and steel.

[1] Derived from *Flanders*, a former country of Europe which included a part of the Netherlands, Belgium, and France. Nearly half the Belgians speak the Flemish language.

Linen and glass are also made. But the country is so small, and there are so many water ways and railways, — as in the Netherlands, — that coal is transported cheaply to all sections. Manufacturing, therefore, is well distributed, although the coal comes from the south.

Commerce. — By its position Belgium secures many of the advantages that Holland enjoys; that is, it is a gateway to and from the interior of Europe. To be sure, its coast line is only about forty miles in length and the water there is shallow; but ANTWERP has an excellent harbor. There is no large river like the Rhine in Holland, but two smaller streams, rising in France,

FIG. 335.

A view in Ghent. Notice the peculiar architecture of the houses.

are navigable for some distance. There is also an extensive system of canals. Besides these water ways, Belgium has more miles of railway, for its size, than any other country; and the railways are closely connected with the large trunk lines. For these reasons transportation of goods is one of the leading industries in Belgium.

While the Belgians do not possess such valuable colonies as the Dutch, they have been prominent in African exploration. It was the Belgian

king who sent Stanley to Africa, and the King of Belgium is sovereign of Kongo State.

Cities.— BRUSSELS, the capital and largest city, situated in the heart of the kingdom, is about the size of Boston. The name Brussels carpets suggests one of its industries; but carriage and lace making are at present among its most important kinds of manufacture. It is an intellectual as well as a political and commercial center, having numerous picture galleries, museums, and schools.

ANTWERP, next in size, is situated about sixty miles from the sea, on a small river. Some of the great steamship lines from New York have their European terminus there, and the port is one of the most important in Europe. The leading kinds of manufacturing are sugar refining, distilling, lace making, and shipbuilding.

Many other cities are distinguished for manufacturing. The largest are LIÈGE, the "Birmingham of Belgium," engaged in the manufacture of firearms, cutlery, glass, and various kinds of machinery; and GHENT (Fig. 335), noted for linen and cotton goods, and for machinery.

REVIEW QUESTIONS. — *The Netherlands.* — (1) Tell about the physiography of Holland. (2) What are the principal mineral products? (3) How does Holland compare with New York in size and population? (4) Tell about the people; the government; agriculture. (5) State reasons for reclaiming the land. (6) What about manufacturing? (7) Give three reasons for the extensive development of Dutch commerce. (8) How have the Dutch come to have several important colonies? (9) Name the principal colonies. (10) Tell about the chief cities.

Belgium. — (11) Compare Belgium with Holland as to physiography. (12) Tell about the importance of Belgium; its people and government; its agriculture; its mining and manufacturing. (13) What reasons are there for its important commerce?

SUGGESTIONS. — *The Netherlands.* — (1) Why are the winds likely to blow with special force and regularity across Holland? (2) Why is this fact of value to the Dutch? (3) What effect must the winds have upon the rank vapors that rise from the damp soil? (4) What do you know about the flower gardens of the Dutch? (5) Have you seen any Dutch pottery, especially Delft wares? (6) Why did not the Pilgrims remain in Holland instead of coming to America? (7) Why should not Rotterdam be as large a city as New York? (8) Find out about the Peace Conference of 1899 at The Hague. (9) What reasons are there for selecting a small country like Holland for this purpose, and for making treaties between nations which have been at war?

Belgium. — (10) There are greater extremes of temperature in Belgium than in England. Why? (11) Find out some facts about the battle of Waterloo. (12) Give several reasons for spading instead of plowing land. (13) Examine a piece of lace. From what material is lace manufactured, and how is the work done?

For REFERENCES, see *Teacher's Book.*

IV. FRANCE

(For Map Questions, see Map, Fig. 337.)

People and Government.— The early inhabitants of France, called Gauls, were conquered by the Romans, who taught them their language and many of their customs. After the fall of Rome, France was divided into independent kingdoms, which were often at war with one another or with neighboring countries.

The situation of France has, however, tended to bring the kingdoms together; for the country is inclosed on two sides by the sea, and elsewhere, in large part, by mountains. Notice how completely the Pyrenees separate France from Spain; and what a barrier the lofty Alps form along the Italian and Swiss boundaries. Even north of the Alps, a part of the boundary is formed by highlands, While the inhabitants were thus partly protected from invasion, there were few barriers within France itself that kept them apart. It was not difficult, therefore, to bring them under one rule. At present France has a republican form of government.

FIG. 336.

A valley on the French side of the Pyrenees.

Monaco in the southeast and *Andorra* in the Pyrenees (p. 365) are the only exceptions. The principality of Monaco, only eight square miles in area, is a noted winter resort because of the fine climate.

Physiography and Climate. — As we have seen, the chief highlands of France are in the south and southeast. Among these highlands the loftiest are the Alps, whose highest peak, Mt. Blanc

(15,781 feet), is in France. Had the mountains stretched along the western coast, the history of France would have been very different. As it is, the prevailing westerlies are allowed to distribute their rain somewhat evenly over the country, supplying all sections with an abundance of moisture for agriculture.

The position of the highlands is of great importance for commerce as well as for farming. Fully three fourths of France is a comparatively level plain sloping westward from the low central plateau, which rises steeply as the western wall of the long Rhone valley. All but one of the large rivers rise in this plateau, and flow gently down its slope to the Atlantic. Thus navigation is possible far into the country. Locate and name the three largest rivers. How does the Rhone differ from the other two?

As might be expected, the summers are warmer than in England, since France lies almost entirely south of that country and is less under the influence of the ocean. The southeastern section, though as far north as Boston, has a semi-tropical climate (Fig. 340), owing to the presence of the warm Mediterranean waters and to the protection from cold north winds afforded by the Alps (pp. 322 and 323).

Agriculture.— France is primarily a farming country, and nearly half the people devote their energies to agriculture, including grazing. The same grains are raised as in England. What are they? (p. 329.) Wheat is the most important, and more of this grain is produced than in any other European country excepting Russia. Yet France raises only about half as much wheat as the United States, and not nearly enough for the needs of her people. Grapes, not important in the British Isles, thrive in the warmer climate of central and southern France.

Grapes form the most valuable of all French crops, and more are raised in France than in any other country of the world. This fruit, although capable of enduring severe cold, requires a warm summer. The distribution of the vineyards, therefore, shows forcibly the difference between the climates of England and France. Grapes do not mature well in northern France, but they flourish in the warm valleys from the Loire southward.

As in other countries, the highlands, as a rule, are capable of little cultivation and are usually given over to grazing. Give examples from other countries. As in England, too, there are broad tracts of lowland which are better adapted to the production of

FIG. 338.

To show Paris and surrounding country. Notice how closely the railways follow the stream valleys. Why should they?

FIG. 337.

MAP QUESTIONS: *France.*— (1) France is the nearest country to the British Isles. Estimate the distance. (2) Compare the two countries as to area. (3) As to population. (4) What waters border France? (5) What countries? (6) In what respects is its position favorable to commerce? (7) What do you observe about the general direction of the rivers? (8) Locate the island of Corsica, a part of France.

grass than to other crops. These facts explain why there are more than thirteen million cattle and twenty-one million sheep in France. What does that signify in regard to manufacturing?

Minerals. — France is quite inferior to the British Isles in its mineral products. Coal is the most valuable mineral; but while Great Britain, after supplying her many factories, exports a large amount of coal, France has to import some. The principal coal beds, from which more than half the output comes, lie close to Belgium. They are, in fact, a continuation of the deposits that were found to be so plentiful in that country. The other beds are small and scattered, but the best of them lie near the center of the country, not far from ST. ETIENNE. Of what advantage is this location?

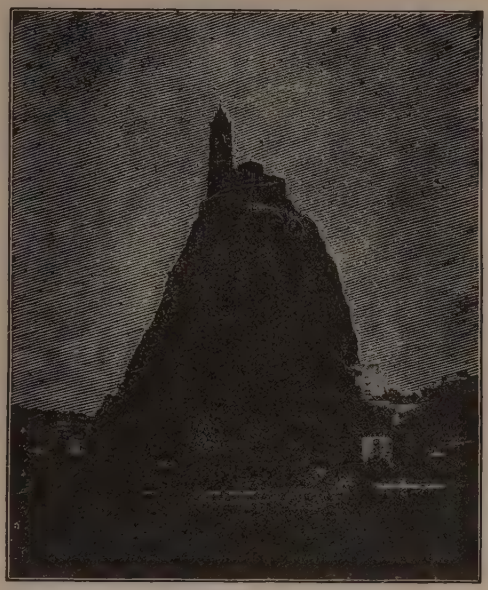


FIG. 339.

A view in central southern France (Monts d'Auvergne on the map). This is a region of extinct volcanoes, and the church is built upon a steep lava hill.

The quantity of iron produced is small and comes mainly from the northeast, near the coal fields. Fine clays for porcelain abound in central France, and building stones are quarried in nearly every part.

Manufacturing. — In spite of the limited supply of fuel, France is a great manufacturing nation. Besides silk and wine, in the production of which that country is the leading nation of the world, there is extensive manufacturing of metal, cotton, and woolen goods.

The Frenchman has a peculiar appreciation of what is graceful, delicate, and elegant. This is illustrated by the fact that our fashions in dress originate in France; and a skirt, a pair of gloves, or a bonnet from Paris is expected to be a trifle more desirable than one bought elsewhere.

Wool and Cotton Manufactures. — The northern part of France is the section especially noted for the woolen industry. Here coal is

most easily obtained; and large numbers of sheep are raised on the hills and plains near by. Besides this, foreign wool from Argentina and Australia is easily imported at HAVRE and at the Belgian port of Antwerp. Remembering that the goods turned out — as hosiery, carpets, and underclothing — are of high grade, and such as wealthy people wish, we see that this location, between the two wealthiest capitals of the world, is especially advantageous. Woolen cloths are, next to silk goods, the most important French export to Great Britain.

Cotton manufacturing — mainly for the home market, as indicated above — is also extensively developed near the coal fields of

FIG. 340.

A street scene in Nice (near Monaco), showing the nature of the vegetation in that warm climate. Find out whether Nice is north or south of your home.

northern France. An important reason for such work at this point is the ease with which American cotton may be imported; and this explains why ROUEN on the Seine is a prominent center for cotton goods. There are also cotton factories in eastern France, where water power is used instead of steam power. Why should there be water power in that section?

Silk Manufacturing. — Because the climate and soil of the Rhone valley are adapted to the mulberry tree, and because coal mines are near by, this section is a great silk manufacturing region. LYON is the center, and St. ETIENNE and PARIS are noted for this industry.

The traveler in the Rhone valley sees grove after grove of mulberry trees, carefully cared for in order to supply an abundance of leaves for the silkworm to eat in summer.

The silkworm moth, at the end of the caterpillar stage, weaves a cocoon about itself. The material of which the cocoon is composed is a thread, about two miles in length, which must be very carefully unwound. The single strand is such extremely fine silk that, in order to make a fiber strong enough for spinning and weaving, it is united with several others.

Since the worms are reared under cover, the silk industry may be carried on in any climate well adapted to the mulberry tree. It is possible, therefore, to make raw silk in many parts of the world; but the feeding of the worms and the transformation of the cocoons into silk for the market require much labor, care, and skill. On that account silk production is chiefly confined to those parts of the world where laborers will accept low wages, and where, owing to generations of such work, habits of watchfulness and care have been developed. China accordingly produces the greatest amount of raw silk; but France, in the midst of the civilized world, where the market for silk goods is greatest, also produces a large quantity and is the leading country for the manufacture of silk. Make as long a list of silk goods as you can.

Other Manufactures. — The extensive cultivation of grapes has been mentioned. Much of the wine made from them is consumed

FIG. 341.

A farm scene in southern central France. The mountain peak is an extinct volcano, one of the Monts d'Auvergne (Figs. 337 and 339).

at home, for in France even the day laborer drinks wine at his meals in place of water. An enormous amount of wine is also shipped abroad. The manufacture of steel goods is important in some places, but to no such extent as in Great Britain. Other kinds of manufacturing are mentioned under the cities.

FIG. 342.

A village in southern France.

Paris. — Paris, the capital of France, is the largest city on the continent of Europe and the third largest in the world. It numbers more than 2,500,000 inhabitants.

Location (Fig. 338). — There is a definite reason for the exact site; for an island in the Seine at that point made the river easier to bridge over, while at the same time it aided in defense. Aside from that, the Seine, having a slower current than the Rhone, and being less subject to overflows than the Loire, is more easily navigable than any other river in France. Its upper tributaries bring it

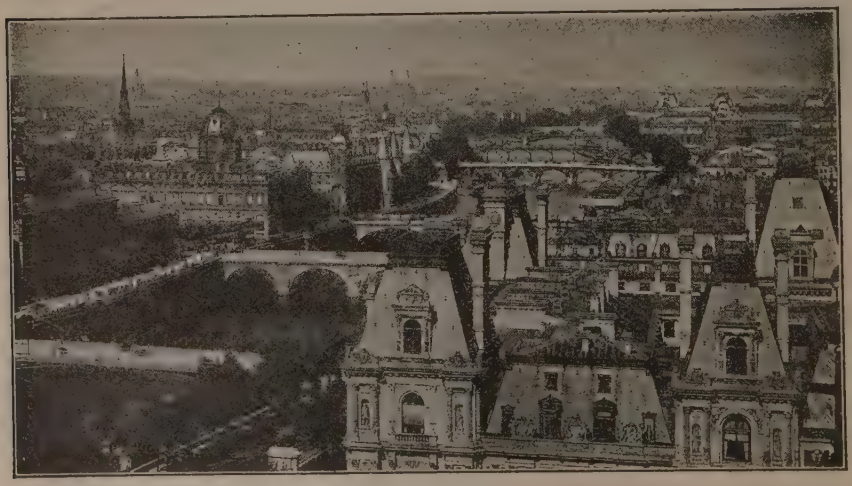


FIG. 343.

A view looking over Paris, with the Seine in the center of the picture.

into close touch with eastern France; and, by the aid of canals, there is water connection with the Loire and Saone, and with the Rhine in Germany. Furthermore, Paris is situated on the main trade route from the Mediterranean to northern and central France, which follows the Rhone, the Saone and the Seine. In addition, Paris is located in the midst of the most fertile portion of the country, and not very far from several other densely populated countries. For these several reasons it has always been the principal French city.

Paris as an Art Center. — Reference has already been made to the appreciation of grace and elegance characteristic of the French

FIG. 344.

Fontainebleau, a beautiful wooded park south of Paris.

people. Napoleon and other rulers collected art treasures from various nations, and founded collections and schools which have made Paris famous. The superiority of this city in that respect is recognized in America by the large number of men and women who go there every year for the study of art. It is not strange, therefore, that Paris should be distinguished the world over for its beauty as a city. The wide streets, the beautiful parks with their fountains and statues, and the fine public buildings and old royal palaces, are wonderfully attractive. Even the dwelling houses are in harmony, for it is required by law that new buildings must harmonize with those near by. Therefore one seldom sees an unattractive house in Paris.

One of the old palaces, known as *The Louvre*, is the most noted art gallery in the world. It contains thousands of works of art.

Among the many interesting suburbs of Paris is VERSAILLES, where there is another palace that was erected in the days of royalty. It is now mainly used as a museum, and scores of the large rooms are decorated

with the finest of paintings. It is among such treasures that the students of art spend much of their time; and it is partly because of the beautiful surroundings that many foreigners reside permanently in Paris.

Manufactures of Paris. — Like other great cities, Paris has too many industries to be specially identified with any particular one. Yet the superior taste of the Parisians has led them to pay especial attention to the manufacture of articles which combine utility with beauty, such as jewelry, furniture, gloves, fashionable shoes, etc. The Sèvres porcelain is made in the suburbs of Paris, and both this and the Limoges ware, manufactured at Limoges, are celebrated for their beauty.

Commerce of Paris. — Although so far inland, Paris ships more goods by water than any other French city. The extensive canal connections have already been mentioned (p. 361). Vast sums have been spent in dredging the lower Seine, so that the depth of water between Rouen and Paris now exceeds ten feet. Small vessels can proceed directly to Paris, but larger ships transfer their goods at HAVRE and ROUEN. Besides this, the chief railways of France radiate in all directions from Paris (Fig. 338). All together, therefore, Paris is the political, artistic, manufacturing, and commercial center of France.

Other Cities. — HAVRE, which is almost as busy a harbor as MARSEILLE, has an extensive trade in coffee from Brazil, and in wheat and other materials from the United States. Another important port is BORDEAUX, on the Garonne River, in the midst of a fertile grape-raising district. It is the chief port for the export of French wines. Locate the cities previously named and tell for what each is important. Note especially LYON, the center of the great silk industry of France.

The leading seaport of France on the Mediterranean is MARSEILLE, located near the mouth of the Rhone. The delta of the Rhone is too marshy for a city, and Marseille occupies the nearest point where there is a good harbor and where other conditions are favorable for a town. For many centuries the Rhone valley was the principal gateway from the Mediterranean to much of Europe. One route leads to the Seine valley, and thence to Paris (p. 361), northern France, and Belgium. Another enters Switzerland through Lake Geneva, out of which the Rhone flows; and still a third route leads, through an opening in the mountains, into the Rhine valley and Germany.

Commerce of France. — Notwithstanding the great amount of internal commerce on the numerous rivers, canals, and railways, and notwithstanding the extensive foreign trade, France is not

a great maritime nation like the United Kingdom. In fact, her merchant marine is only one tenth as large as that of the British Isles and three fifths that of Norway. This is not entirely because of lack of acquaintance with the sea, for there are more French than British fishermen. The small number of good harbors, and the frequent and destructive wars during the last century, are among the reasons why France depends so largely upon other nations, as upon British and Norwegians, for vessels to carry her goods. Why is it safer for her to be thus dependent than for Great Britain?

Colonies (Fig. 354). — On the other hand, France has been extensively engaged in exploration. You will remember that the French formerly had extensive possessions in North America. Where were they? Where are her present possessions in the New World?

In Asia, France holds a part of Indo-China and a very small bit of India; and she has numerous islands in different portions of the world (Fig. 354). But her most important colonies are in Africa, as follows: (1) Algeria and Tunis, across the Mediterranean; (2) a vast area south of these countries, including a large part of the Sahara Desert, the Sudan, the upper Niger, and the country north of the Kongo River; and (3) the large island of Madagascar, east of southern Africa.

REVIEW QUESTIONS. — (1) Tell about the early inhabitants; (2) the influence of the boundary line for unity; (3) the government; (4) the physiography and climate. (5) What are the principal farm products? (6) Which of these have been found in Great Britain? (7) Which have not been found there? Why? (8) Tell about the mineral products. (9) Give reasons for the extensive manufacturing. (10) Tell about the woolen manufactures. (11) Cotton manufactures. (12) Tell about silk and silk manufacturing. (13) What about other manufactures? (14) Tell about Paris; its size; location; artistic attractions; manufactures; commerce. (15) Tell about: (*a*) Havre, (*b*) Bordeaux, (*c*) Lyon. (16) What are the reasons for the location of Marseille? For what is it important? (17) What is there peculiar about the commerce of France? (18) Tell about the colonies.

SUGGESTIONS. — (1) What is the name of the present President of France? (2) Give reasons why one river, as the Loire, might be much more subject to overflows than another, as the Seine. (3) Examine Figure 306 to see if the glacier reached into any part of France during the Glacial Period. (4) Raise a silkworm from the egg. (5) Examine a cocoon and see if you can unravel some of its thread. (6) Also unravel a piece of silk goods and examine the threads. (7) What influence on the commerce of Marseille has the construction of railway tunnels through the Alps probably had? (8) The construction of the Suez Canal? Why? (9) See if you can find any porcelain ware from Sèvres or Limoges. (10) What changes might be brought about in your locality if the people there prided themselves greatly on the beauty of the streets, houses, etc., as the Parisians do? (11) What pictures of fine statuary have you seen? (12) Find the names of some of the great French painters.

For REFERENCES, see *Teacher's Book*.

V. SPAIN AND PORTUGAL

Map Questions (Fig. 337). — (1) What other cities in the world are in about the same latitude as Madrid? (2) Compare the area of the Spanish peninsula with that of France (Appendix, p ii). (3) Compare the populations (Appendix, p. ii). (4) Compare the directions taken by the rivers. (5) Judging from the map, what would you expect as to the number of good harbors? (6) What has been stated about the temperature and rainfall in Spain? (pp. 321 and 323.) (7) What islands in the Mediterranean Sea belong to Spain?

People and Government. — Spain and Portugal at one time had much the same rank among nations as is now held by Great Britain. Name countries that they controlled. Mention some noted Spanish and Portuguese explorers. Now, however, both Spain and Portugal are classed among the weaker nations of Europe.

The mountainous character of the peninsula has been one important cause of the decline of Spain and Portugal. The various races

Fig. 345.

The Alhambra, one of the last strongholds of the Moors, — Mohammedans who once conquered and occupied Spain.

on the peninsula, cut off from one another by table-lands and mountain ranges, have never been fairly blended into one people. For centuries they were divided into small, independent kingdoms having different languages. Just before the discovery of America, however,

most of these states were brought under one rule by the marriage of Ferdinand and Isabella ; and later even Portugal was joined to Spain.

But Portugal, which is partly separated from Spain by deep gorges and canyons, soon broke away. Also *Andorra*, a tiny country in the Pyrenees, was never fully conquered and is still independent; and the union of some of the others has been by force rather than by choice. At present the parts of Spain are held together under a limited monarchy, and the same is true of Portugal.

Physiography and Climate. — The key to many important facts about Spain and Portugal is found in the extensive elevation of the land. On the northern boundary stand the Pyrenees, continued on the west by the Cantabrian Mountains, while in the extreme south are the lofty Sierra Nevada ranges. Between these two systems is a broad plateau, from two to three thousand feet in elevation, with numerous short, broken mountain ranges.

In the Ebro valley on the northeast and the Guadalquivir (meaning Great River) valley on the southwest there are lowlands. Point to these rivers on the map. The only other extensive lowland is a narrow strip near the sea, which reaches most of the distance around the peninsula. A very large proportion of the surface, therefore, is made up of plateaus and mountains.

This elevated surface has been instrumental, in the first place, in preventing Spain from becoming a great thoroughfare for the transportation of goods. The position of the peninsula, between the two busiest seas of the world, and between Africa and central Europe, suggests that it might be a valuable route for commerce. But the highlands *separate,* rather than unite, these regions.

The highlands have an important influence also on the climate. Owing to the elevation the interior has cold winters, though the summers are hot ; and because of the fringe of mountains, the rainfall is light everywhere except near the northwestern coast, where the vapor is condensed in rising over the slopes (Fig. 310). The southern portion of Spain, like Lower California, being in the horse latitudes (p. 248), is so arid that agriculture without irrigation is impossible.

There are several other effects produced by the highlands. In the first place, the rivers are unnavigable ; for in descending from the arid plateau to the coastal plains their courses are rapid and their volume slight. Besides that, most of them have cut such deep, narrow valleys, like that of

our Colorado Canyon, that they are not only useless for irrigation but are even a great hindrance to communication. The Guadalquivir, which has a wide valley and which vessels are able to ascend as far as SEVILLE, is the principal exception.

Since the interior is so arid and rugged, it must have little timber, little agriculture, few people, and few roads, railways, and canals. With one or two exceptions, therefore, the chief towns are to be found along the coast.

Agriculture and Grazing. — In one respect the elevation of the land is an advantage, because it insures great variety of climate and hence many kinds of farm products. What countries of South America does this condition call to mind?

We may expect grazing in the uplands and among the mountains, as in similar rugged and arid regions elsewhere. Name some of them. Spain is noted for the excellent grade of its sheep and mules. There are also many cattle, especially in the rainy northwest; but the fact that so much of the country is arid explains why there are many more sheep and goats than cattle. The sheep often wander about in flocks of ten thousand under the care of a number of shepherds and their dogs. In summer they feed among the mountains, but in winter they are driven down to the more protected lowlands for shelter.

FIG. 346.

A sheep pasture at the Convent of Palos in Spain.

Wheat is the most common crop in Spain, since it requires comparatively little rain; but there is far less than might be, since so many of the Spaniards lack energy and enterprise.

In many of the valleys where irrigation is possible, and especially on the lowlands along the coast, the farmers are more progressive and prosperous. Barley, rye, and corn are raised in addition to wheat, and these are among the staple foods of the people. Quantities of grapes are also grown in Spain and Portugal; and in the southern part of the peninsula the bark of the cork oak is a source of income to both countries.

The arid southeastern coast is wonderfully productive. One reason is the warm climate, due to the influence of the Mediterranean; another is the number of mountain streams, which, though useless for navigation, are extremely valuable for irrigation. Some of the products of this section,

besides wheat and corn, are cotton, grapes, olives, figs, dates, oranges, lemons, and rice. Several crops of some products may be raised in a year.

Mining. — Spain is remarkably rich in minerals. Lead and silver are mined in the upper valley of the Guadalquivir, and along the southeastern coast. Some distance northeast of SEVILLE a large quantity of *quicksilver*, or mercury, is obtained; and northwest of

FIG. 347.

A wooden-wheeled ox cart, to illustrate the backwardness of the Spaniards.

Seville, and in southern Portugal, are some noted copper mines. Coal and iron ore are found in several parts of the peninsula, but the largest output of each occurs on the northern slope of the Cantabrian Mountains. Spain produces more quicksilver than any other country, and is exceeded only by the United States in the output of copper and lead.

Here, however, as in other industries, the character of the people prevents proper development of the resources. Much of the benefit from the mines is due to the capital and enterprise of foreigners; the English and French are in control of the copper mines, and the Rothschilds own the quicksilver.

Manufacturing. — From what has been said above, it is apparent that manufacturing cannot flourish. This fact is all the more evident when we consider that more than two thirds of the Spaniards, and three fourths of the Portuguese, cannot read. Thus, although they have coal beds, much of their iron ore, instead of being smelted at home, is shipped to the coal fields of Swansea in Wales to be smelted. In some places, however, as will be seen in our study of the cities, there is manufacturing of certain kinds.

Principal Cities of Spain. — MADRID, the metropolis and capital of Spain, has over a half million inhabitants; but unlike most other large cities so far studied, it is not an important manufacturing center. Why not? The explanation of its size is found in its central location, and the fact that it is the seat of the government. In crossing the

peninsula to connect the coastal cities, all the principal railway lines converge at this point, and thus Madrid has become the intellectual and political center of the country.

To some extent, Madrid, with its wide streets, magnificent royal palace, and one of the finest art galleries in the world, recalls the attractions of Paris. But one of its most frequented places is an enormous building which seats many thousands and which is used for bull fighting. In its indulgence in this brutal sport the city bears no resemblance to Paris; nor is there any resemblance in its surroundings. From the streets of Madrid one looks across the country for miles and miles, seeing not a tree nor fence nor house; only the weeds and scattered vegetation of an arid waste.

Fig. 348.
A Spanish bull fight.

The city next in importance upon the highlands of Spain is Granada, the last stronghold of the Moors. To this point among the mountains, at the intersection of the best routes of travel from east to west, and from north to south, these people withdrew. Here they maintained themselves for two hundred years and developed a city of four hundred thousand population. At present, Granada contains less than one fourth as many inhabitants, and its principal attraction is the Moorish palace, or Alhambra (Fig. 345), one of the finest examples of Moorish architecture in existence.

On the lowlands west of Granada are Seville and Cadiz, both flourishing cities at the time when vast stores of plunder were being brought from the Spanish colonies in the New World. Cadiz is now a fortified naval harbor; and Seville is recovering a degree of her former commercial importance. One tobacco factory in Seville employs about five thousand women in making cigars and cigarettes.

Gibraltar, a steep hill, with bold cliffs rising on nearly all sides, and with a town at its base, has belonged to England since 1704. This rock hill (Fig. 349) is, perhaps, the strongest fortification in the world, and guards the entrance to the Mediterranean. Why should the English especially want such a stronghold there?

Malaga grapes serve to remind us of the coastal city by that name, and of the products about it. It has one of the warmest climates in Europe.

VALENCIA and BARCELONA are the leading seaports of Spain. The region about the former is a beautiful garden, much like southern California, which it resembles also in products. Name some of the products. In addition, rice is grown on the lowlands near the coast. BARCELONA, the second Spanish city in size, is the principal seaport and an important textile manufacturing center as well.

On the whole Spain is poorly provided with harbors; and while the majority of the people dwell near the coast, and many engage in fishing, they share little at present in international commerce.

FIG. 349.

The rock of Gibraltar, showing the narrow neck of land which connects it with the mainland.

Colonies of Spain. — The only remnants now left to Spain of her once magnificent foreign possessions are for the most part in Africa. These include a few small settlements on the coast of Morocco; a portion of the western coast of Sahara, having little value; and a few small islands in the Gulf of Guinea. The Canary Islands, west of the northern coast of Africa, and the Balearic Isles in the Mediterranean also belong to Spain.

Principal Cities and Colonies of Portugal. — LISBON and OPORTO are the chief cities of Portugal. The former, the capital and metropolis, lying on a broad bay where the Tagus River enters the sea, has one of the finest harbors in existence. With its white houses, its cathedrals and palaces, — all partly buried in trees on

the hillsides surrounding the harbor, — it vies in beauty with the most attractive cities in the world.

The misfortunes of Lisbon have been many. It has suffered from sieges, plagues, and earthquakes. The most terrible catastrophe happened in 1755, when an earthquake, followed by fire, destroyed most of the houses and a large part of the population.

Oporto gives the name to Port wine. The lower part of the Douro valley is one of the richest wine districts in Europe, and Oporto, like Bordeaux, is an important point for its export.

Portugal, like Spain, has lost much of her foreign territory. The Azores Islands, far to the west in the Atlantic, and the Madeira Islands,

Fig. 350.

The harbor and city of Oporto. Describe the situation of the city.

to the southwest, are a part of the kingdom. The Cape Verde Islands, a volcanic group off the coast of Africa, are dependencies. Portugal also has large possessions on the mainland of Africa and smaller ones in Asia.

Review Questions. — (1) Tell about the people and government of Spain and Portugal. (2) Describe the highlands of the peninsula. (3) Mention several consequences of this elevated condition of the land. (4) Tell about agriculture and grazing. (5) Tell about the mining. (6) What can you say about manufacturing? (7) Give the main facts about the following cities: (*a*) Madrid (*b*) Granada, (*c*) Seville, (*d*) Cadiz, (*e*) Malaga, (*f*) Valencia, (*g*) Barcelona. (8) For what is Gibraltar noted? (9) What about the colonies of Spain? (10) Tell about (*a*) Lisbon, (*b*) Oporto. (11) What about the colonies of Portugal? (12) Name and locate the principal cities of Spain and Portugal.

Suggestions. — (1) About what portion of the boundary line between Spain and Portugal is formed by rivers? (2) What must be the influence of railways upon the old-fashioned methods of farming in the interior? (3) Recall the Spaniards' treatment of the Incas in South America.

For References, see *Teacher's Book*.

FIG. 351.

Some of the few wild animals of Europe. Domestic animals are abundant, including the reindeer of the tundras. Even the bear is tamed and exhibited. Have you ever seen one of these European bears performing on the street?

FIG. 352.

A delta at Menaggio, on Lake Como, Italy. Here a town is built, because on the mountainous coast of this lake few other places than the deltas are level enough for towns.

FIG. 353.

MAP QUESTIONS: *Norway, Sweden, and Denmark.* — (1) The Scandinavian peninsula is the largest in Europe. What is its length in degrees? In miles? (2) How does its western coast remind you of the western coast of Scotland and Ireland? (3) What evidences do you see of glacial action? Where? (4) What do you observe about the rivers of Sweden? (5) Which of these three countries has the largest population? (6) How does it compare with New York State in area and population? With your own state? (See Appendix, pp. ii and iii.) (7) Make the same comparison for the smallest of the three countries. (8) What points in North America are about the same latitude as Christiania and Stockholm? (9) On Figure 267 find how near to Scandinavia the Gulf Stream drift reaches.

FIG. 354.

Possessions and dependencies of the United States, France, Germany, and the Netherlands.

VI. NORWAY, SWEDEN, AND DENMARK

(For Map Questions, see Map, Fig. 353.)

People. — The people of these three countries have long been more or less united, for the well-settled southern portions of Norway and Sweden are not separated by any natural barrier, while only a narrow, shallow sea separates Scandinavia from Denmark. Being descended from a common stock, and at times having a single government, they have many interests in common. The written language of the Norwegians and Danes is still the same, and Norway and Sweden until recently were united under one king, although they are now entirely independent of each other. Denmark has always been independent, and, like Norway and Sweden, it is a limited monarchy. Norway and Sweden were once a part of Denmark.

These people have been closely connected with our own history, for they made some of the early invasions and settlements in Great Britain, and are thereby to be numbered among our ancestors. Their daring seamen reached Greenland, by way of Iceland, and discovered America nearly five hundred years before Columbus approached its shores. In the present century they have migrated to the United States by thousands, and have chosen homes in many states, but particularly in Minnesota, Illinois, and Wisconsin.

Physiography and Climate. — There are only about one fourth as many inhabitants in these three countries together as there are in the British Isles; yet in spite of frequent European wars, they have preserved their independence through many centuries. This has been due in part to their peculiar position. The only land approach to Scandinavia is by way of Lapland in Russia, which is so far north that it is very cold. Thus the peninsula is almost as isolated from other nations as is Great Britain.

Denmark, on the other hand, is partly connected with Germany. However, the most important parts of Denmark, the islands, are completely separated by water. These islands and the Danish peninsula (Fig. 375) are the higher portions of a lowland that were left projecting above the water when sinking of the land changed

the Baltic valley to a shallow sea (p. 319). Standing at the entrance to the Baltic, they guard the approaches to this inland sea, and naturally Germany, Russia, and other nations have long coveted them. But as neither of the Great Powers was willing that one of the others should hold them, little Denmark has been allowed to continue its independent existence.

FIG. 355.

A Norwegian fjord with steep cliffs rising from the very water's edge.

The rugged surface and severe climate of Scandinavia have also served as a protection against invaders. From its southern to its northern end the peninsula is mountainous. It is an ancient mountain land (p. 317), much worn, and cut by deep stream valleys. While some peaks reach an elevation of six to eight thousand feet, most of them are lower and of so nearly the same height that the upland resembles a plateau when viewed across the mountain crests. The boundary between Norway and Sweden follows the divide between the east and west flowing streams; and since this divide is near the western side of the peninsula, those streams which flow in that direction are made shorter. Therefore, in all but the southern part, Norway is a narrow, mountainous region crossed by short streams flowing in deep, steep-sided valleys (Fig. 355).

Agricultural Districts. — The mountainous surface and cold climate are unfavorable to agriculture, although the warm ocean waters (p. 321) exert an enormous influence here, as in the British Isles. In rising over the mountains, the westerly winds supply abundant rain and snow, and it is the latter that causes the numerous glaciers.

Since the slope on the eastern side is much the longer, Sweden has extensive lowlands throughout its length. But these lowlands are so far north, and so protected from the influence of the sea, that in all but the southern part agriculture is of little importance.

Although Denmark is free from mountains, the northern and western portion of the Danish peninsula (called Jutland) is a sandy waste, so that only the islands and the southeastern part of the peninsula are very productive.

In these three countries, therefore, there is a comparatively small area that is valuable for agriculture, and the sections lie near together; namely, in southern Norway and Sweden and in eastern Denmark.

Industries and Cities of Norway. — Since less than four thousand (out of a total of one hundred and twenty-five thousand) square miles in Norway have a soil and climate adapted to agriculture or pasturage, the amount of stock and grain produced is small. There-

FIG. 356.

Bergen, Norway, with its deep, narrow fjord harbor.

fore, much meat, flour, and other food must be imported. Also, while there are some silver and copper mines, coal is entirely lacking, because the rocks were formed before the Coal Period. Manufacturing, therefore, is little developed. Even the fine water power is little used, because raw products for manufacturing are not abundant.

On what, then, do the two million inhabitants depend for a living? They have two valuable resources, — lumber and fish. More than one fifth of the country is forest-covered, — pines being most common, — and lumber, wooden goods, and paper are the most

important exports. As in Maine, the rapidly flowing rivers are of use in moving the logs from the forest, and also in supplying power for the sawmills and planing mills.

Fish abound on the shallow banks along the irregular western coast, especially codfish in the neighborhood of the far northern Lofoden Islands. The North Sea with its many fish is also close at hand, and the Arctic Ocean with its seals and whales. Over a hun-

FIG. 357.

North Cape, the northern point in Norway. The summer sun is shining here at midnight, because the cape is within the Arctic Circle.

dred thousand Norwegians are engaged in the fishing industry. Along the fjords every family owns a boat, and knows how to make as well as use one. While the men are at sea the women work the small farms or garden patches.

The abundance of lumber and the love for the sea, developed through centuries of experience in navigating the deep fjords and in fishing, have given rise to a third great industry, that of carrying goods for other nations. The timber for wooden vessels is easily supplied, and this small Norwegian nation has at present a greater *number* of freight vessels than any other European country except the British Isles.

These facts help to explain why the Norwegian towns are found along the coast. Indeed, it is rare to find even a village in the interior. The two principal cities are CHRISTIANIA, the capital and largest city, and BERGEN (Fig. 356). The former is situated at the head of a long, narrow, sunken valley, or fjord, which makes an excellent harbor, and the city is the principal port and distributing center for southern Norway. Bergen is the important fishing port, as Aberdeen is in Scotland and Gloucester in Massachusetts.

Scenery on the Western Coast. — As in the British Isles and northeastern North America, the sinking of the Scandinavian peninsula has caused the sea to enter the river valleys, forming many bays, peninsulas, and islands. It is estimated that there are fully ten thousand islands along the coast of Norway. Owing to the fact that, before the sinking took place, the river valleys were deeply cut in hard rock, the bays are usually long, narrow, and deep fjords (Fig. 355).

Some of the fjords extend fully ninety miles inland, and swollen streams from the mountains frequently plunge, for a fall of a thousand feet or more, over the vertical cliffs which bound the fjords. The cliffs are often only barren rock; but here and there, where the slopes are not too

FIG. 358.

Hammerfest, Norway, far within the Arctic circle where the sun does not set from May 13 to July 29. This town is the nearest to the pole of any in the world excepting Upernivik in Greenland, where all but a few of the inhabitants are Eskimos.

steep, green forests cover the surface; glaciers are frequently in sight; and occasionally, upon a level patch, a hamlet of fishermen's homes (Fig. 309) is seen. These hamlets are usually upon the deltas of small streams and are connected with the outer world, and with other villages,

by no road or pathway except the waters of the fjord. So isolated are these hamlets that each man must learn to do many things, — farm, fish, tan his leather, make his shoes, build his boat, his house, etc.

Industries and Cities of Sweden. — Agriculture is the leading industry of Sweden, owing to the extent of the fertile lowlands. The former glacier (Fig. 306) swept rocks and soil down from the western highlands, giving to the southern part of the country much the same appearance as New England. Oats are raised in most abundance, but rye, barley, wheat, and potatoes are also produced. One reason why these products can mature here is the absence of cool summer winds from the ocean; another is the great length of the summer days in this far northern latitude. Much live stock is also raised, and butter is exported to Great Britain.

However, nearly one half the area of Sweden is covered with forest, and lumber is by far the greatest article of export, as in

FIG. 359.

The royal palace at Stockholm.

Norway. Indeed, these two countries supply much of the lumber needed in western Europe. Their wood is especially valued because of its hardness and durability — qualities that are due to the closeness of the annual rings caused by the shortness of the summer season.

Mining is the third important industry. There are silver, lead, zinc, and copper mines. Some coal is found in the southern end, and the country has long been noted for its excellent iron ore. But since

the principal iron mines are located far from the coal, there is little iron manufacturing in Sweden. However, as in portions of the Lake Superior district of the United States, some of the iron ore is smelted by the use of charcoal, and some by coal mined in Sweden or brought from other countries. The Swedish iron is of such excellent quality that it is eagerly sought where the highest grade of steel tools is manufactured, as in Sheffield, England.

Sweden possesses excellent water power for various kinds of manufacturing, and in recent years the numerous rivers have begun to be utilized, so that manufacturing is making rapid progress there.

The two principal cities — STOCKHOLM, the capital, and GOTHENBURG — are on the coast; but there are other small seaports and inland mining towns. Stockholm is famous for its fine palaces, public buildings, museums, and commercial establishments. The situation of this city is one of marvelous beauty, on an excellent harbor; but unfortunately it is blocked with ice for four months each year. Owing to the numerous lakes and to canals, it is connected by water, as well as by rail, with the chief points in a populous region, and is therefore the principal distributing center for imports. Gothenburg, the chief center for exports, possesses the important advantage that its harbor is seldom frozen over. It is connected with Stockholm by railway as well as by lake and canal. Much of the distance between these two cities is occupied by lakes.

The principal foreign trade of both Norway and Sweden is with Great Britain. Give reasons for this. What must be the main articles of import and export? Next to Great Britain comes Germany. Can you suggest reasons for this?

Industries and Cities of Denmark. — There is neither coal nor metal in the rocks of Denmark. The only mineral product of value is clay, well suited to the manufacture of porcelain, which is an important industry. As in Ireland, the lack of coal for fuel is partially met by peat from the bogs and swamps of the northern and western parts.

Farming, especially dairying, is the chief industry, and butter constitutes one half the exports of Denmark. The laws of the nation discourage large farms, so that each farmer, by carefully cultivating a small patch of land, as in Belgium, obtains the most that it can yield.

The nearness to good fishing banks has naturally made fishing important; and this, together with the influence of island life, has created such a love for the sea that large numbers of Danes serve as sailors on British and other foreign vessels.

As in the case of Norway and Sweden, the principal foreign trade of Denmark is with Great Britain. Why? What goods may well be exchanged? One might therefore expect an important seaport on the western coast; but that coast is so low, and so shut in by sand

FIG. 360.

A view in Copenhagen.

bars, that good harbors are lacking. In fact, the only harbor in all Denmark that admits large vessels is COPENHAGEN (merchants' harbor) on Seeland Island. Since this point guards the entrance to the Baltic Sea, there is a double reason why Copenhagen is the principal city of Denmark. The fact that it is the capital also increases its importance. It ranks nearly with Cleveland in size.

Colonies of Denmark. — The Danes, even more than the Norwegians, have been daring seamen and explorers of foreign lands. Although some of their possessions have been lost, Greenland and the Faroe Islands are still Danish colonies, and Iceland is a Danish dependency. In the *Faroes*,

consisting of a score of small islands north of Scotland, the principal products are sheep and fish. Why might you expect these two particularly?

Iceland, which is larger than Ireland, and more than twice the size of Denmark, is an island of volcanic origin. Over a hundred volcanoes are found there, twenty-five of which have been in eruption during historic times. Mt. Hecla is one of the most noted of these. Destructive earthquakes are common, and there are also geysers similar to those found in our Yellowstone National Park. The interior is a desert plateau, for the most part covered with snow, and hence uninhabited. Near the sea, however, there is some good pasture land, and the people are principally engaged in raising cattle and sheep. Fishing is important, and down from the eider duck is a valuable product.

Review Questions. — (1) What about the people of these three countries? (2) Describe briefly the surface of Norway; of Sweden; of Denmark. (3) Where are the principal farming sections? (4) Tell about agriculture in Norway. (5) Why is there little manufacturing there? (6) What is the principal export? Why? (7) What about fishing? (8) Give reasons for the large merchant fleet of Norway. (9) Tell about the cities of Norway. (10) Describe the scenery on the western coast. (11) Tell about Sweden: principal industry; forests; mining; manufacturing; principal cities. (12) What are the industries in Denmark? (13) Tell about Copenhagen. (14) Tell about the foreign territory of Denmark. (15) What are the important facts about Iceland? (16) Give reasons why Norway, Sweden, and Denmark have their principal foreign trade with the British Isles.

Suggestions. — (1) Why should the telephone prove of special importance among the fishing towns scattered along the coast of Norway? (2) By use of a globe explain why the sun does not set for weeks at a time at Hammerfest. (3) Why is whale and seal fishing important as a means of furnishing light during the long night of this northern land? (4) What do you know about the life of the Laplanders? (5) Why should Bergen be one of the rainiest cities of Europe? (6) Give reasons why harbors on the Baltic should be blocked by ice much oftener than those on the western coast of Norway. (7) Can you give a reason why so many matches should be made in Sweden? (8) Give all the reasons you can to explain why the Norsemen should have become such daring navigators. (9) Hans Christian Andersen was a native of Denmark. What stories do you know that were written by him? (10) Read and retell stories of the Norse gods in old-time mythology.

VII. RUSSIA

Map Questions (Fig. 353). — (1) About how much of Europe is included in Russia? (2) What part of the distance from pole to equator is included? (3) What does this suggest concerning temperature and rainfall? (4) How much of the boundary of Russia is seacoast? (5) Name the seas which border it. (6) Name the mountains on or near the border. (7) What portion of Russia is occupied by plains? (Fig. 304.) (8) In what directions do the large rivers flow? Name the three longest. (9) What peculiar fact do you notice about the Caspian Sea? (10) Find Poland, Finland, and Lapland. (11) What parts of Asia are in the Russian Empire? (Fig. 403.)

Size and Position. — Russia in Europe is larger than all the other European countries together; and the Russian Empire, which includes Siberia and other lands in Asia, occupies about one sixth of all the land upon the globe. The empire extends from the Baltic on the west to the Pacific on the east, and within its borders is included a great variety of climate.

In spite of its vast extent, the development of Russia is greatly hindered by the lack of good harbors. In this respect it contrasts strongly with the United States. To be sure, the sea forms a large portion of the Russian boundary; but ARCHANGEL, the principal port on the White Sea, is ice-bound for nine months, and the Baltic ports for four or five months each year. Besides this, the entrances to the Baltic and Black seas are guarded by foreign nations. Why are the Caspian ports of little use?

Physiography. — Most of the large rivers in western Europe have their sources in the mountains. Give examples (Fig. 304). It is not so, however, in Russia, where the central divide is a low, hilly region less than twelve hundred feet above sea level at its highest point. Aside from the mountains along the border this is the highest part of Russia. How does it compare in altitude with the highest point in flat Holland? (p. 346.)

From what has been said, it is evident that most of Russia is an almost level plain (Fig. 304). Since several of the rivers are very long, what must be true as to the velocity of their currents? What must follow as to their value for navigation? What about the ease of canal construction?

In southeastern Russia, on the other hand, are the lofty Caucasus Mountains (Fig. 307), in which one of the peaks, the extinct volcano Mt. Elbruz, is the highest mountain in Europe. But, at the very base of these mountains, bordering the Caspian Sea, are broad plains which in places are even lower than the level of the sea.

The Caspian Sea, into which the longest river of Europe pours its floods, is the largest inland sea in the world. In spite of the enormous volume of water which enters these inland seas, the evaporation in that dry climate has caused them so to shrink in size that neither the Caspian nor the Aral Sea (Fig. 403) is now connected with the ocean. The surface of the Caspian is eighty-five feet below sea level, and by evaporation it is steadily growing smaller and salter, leaving broad, salt-covered plains round about it.

Climate. — The influence of distance from the ocean upon temperature and rainfall is well illustrated in Russia. Moscow is in the same latitude as Edinburgh; but while at Edinburgh the average temperature for January is 37°, at Moscow it is nearly 25° colder.

FIG. 361.

A Laplander's hut in northwestern Russia.

Notice (Fig. 268) which summer isotherms pass nearest to these two cities. It was the severity of the Russian winter that caused Napoleon Bonaparte to lose nearly the whole of a great army when he was invading that country in 1812. What effect must this cold have upon navigation of the rivers?

Extreme drought, as well as extremes of temperature, are found in parts of eastern Russia. Although the rain-bearing winds meet with no barrier in sweeping over such level land, they nevertheless

FIG. 362.

Laplanders dressed in furs.

deposit so much moisture on the countries of western Europe that no part of Russia has heavy rainfall; and the eastern part averages less than twenty inches per year (Fig. 310). Since this amount is barely sufficient for agriculture, the crops suffer, and famines follow in especially dry seasons. Southeastern Russia is altogether too arid for farming, being not only far from the ocean, but so far south that it is not greatly influenced by the prevailing westerlies.

People and Government. — The plains of Russia have offered no better barrier to the inroads of invaders than to the winds. We therefore find many kinds of people united under Russian rule. Most

of these belong to the white race, but to a different division from the German and British peoples. The Russians are *Slavs*, while the inhabitants of Germany, Scandinavia, and the British Isles are of the *Teutonic* division. But Russia also contains many Jews, Teutons, and other people, including the Lapps (Figs. 361 and 362), who are classed with the Mongolian race. All together not less than forty languages are spoken within the realm.

In former centuries, while other parts of Europe were advancing in civilization, Russia was being raided by outsiders and its progress retarded by conquest. The country was so remote from western Europe that it felt little influence from the growing civilization of the west. Moreover, approach by water was then difficult, because formerly the only Russian seacoast was on the Arctic. It was not until the time of Peter the Great (1682–1725) that Russia began to learn the lessons of civilization from other European nations

FIG. 363.

A fisherman's house in Finland. Fishing is a very important industry in Russian waters; and there is a great demand for fish, owing to the number of fast days kept by the Greek Church, to which the majority of Russians belong.

The Emperor, or *Czar*, is an absolute monarch "whose will alone is law." On purely local matters, however, the peasants have a voice. Those of a locality meet in a *Mir*, or assembly, to discuss matters of common interest and to elect officers from their number, somewhat as is done in town-meetings in the United States Naturally, in this day of popular government, many of the people are dissatisfied, and owing to this unrest, the Czar has granted a form of representation to the people in a national body called the *Duma*. Some of the most highly educated among the Russians have joined with the peasants and industrial classes in the movement toward a constitution.

Lumbering. — Nearly a third of European Russia is forest-covered,

and the timber resources, as in Norway (p. 378), are among the greatest of the country. This forest supplies not only lumber, but pulp for paper and bark for tanning. Many fur-bearing animals live in the forest, as was formerly the case in other parts of Europe.

Farming and Grazing. — Both in the forest region and on the open plains to the south there is extensive agriculture. Fully nine tenths of the people are supported by farming, which makes Russia primarily an agricultural country.

The most important crops are the grains, especially rye, wheat, barley, and oats. Russia ranks next to the United States among grain-producing countries, and wheat is one of its principal exports. Another important crop is hay; and potatoes, sugar beets, and flax are extensively raised in the cool temperate climate. In southern Russia the warm climate permits the culture of grapes, tobacco, and corn; and south of the Caucasus even olives and cotton are produced.

On the grazing lands of the arid steppes, which resemble our western plains, many sheep, cattle, and horses are raised. The nomadic herdsmen, such as the *Cossacks*, still retain many of the customs of the shepherds and herders of Bible times, who dwelt farther south in Asia.

Mineral Wealth. — Some parts of Russia contain mineral deposits of great value. In the Ural Mountains, for example, are gold, silver, copper, platinum, and other metals, besides some precious stones and graphite, or "black lead," which is used in lead pencils.

Coal and iron are mined in several parts of Russia (Fig. 305), and each year the amount is increasing. As in Great Britain, some of the iron ore is so near coal and limestone that it is easily smelted.

Russia ranks next to the United States in the production of petroleum. This oil is found in several places, especially at BAKU on the Caspian. But since its quality is not as good as that of the United States, it is less useful for kerosene. Large quantities are therefore consumed as fuel for steamers on the Caspian and Volga.

Manufacturing. — Although numerous factories have recently been established in Russia, about six sevenths of the manufacturing population carry on the work by hand in their own homes. What a contrast to the United States and to Great Britain!

Principal Cities and their Commerce

Moscow and Nijni Novgorod. — The former isolation of Russia from other countries is illustrated by the fact that the principal cities were for a long time situated far in the interior. For example, Moscow, the second city in size and one of the chief manufacturing centers, and once the capital of the empire, is located almost in the center of the realm, as Madrid is in Spain. The point was well chosen, because rivers, which canals could easily connect, diverge from this section in all directions. By the introduction of railways the advantage of this location was so increased that Moscow is now the great railway center of Russia, as Madrid is of Spain, and for the same reason. State this reason (p. 367). But the land about the city, unlike that around Madrid, is fertile and densely populated.

Not only is Moscow adorned with royal palaces and government buildings, but it is the holy city of Russia, and therefore has numerous convents and churches (Fig. 364). The University of Moscow, the largest in the empire, is attended by about four thousand students.

East of Moscow, on the Volga River, is Nijni Novgorod, renowned for its annual fairs. A great trade center is needed somewhere in this region for the exchange of Asiatic and of Russian products, and this city is suitable for the purpose because of its superior water connections.

Point them out (Map, Fig. 353). The fairs, held in August and September, are the greatest in Europe, and attract as many as two hundred thousand strangers annually. In a single season goods are exchanged to the value of nearly $200,000,000, and prices are fixed on crops and other materials for the coming year. Why could not such a center for trade be better located upon the Caspian Sea?

Fig. 364.

Greek Church at Moscow.

St. Petersburg. — While the two cities just described are very old, their position in the interior is not well adapted for communication with distant nations. It was this fact which led Peter the Great, in 1703, to found St. Petersburg at the head of the Gulf of Finland. The site selected is very marshy, and the climate is cold, foggy, and unhealthful. Moreover, the arm of the sea on which the city is situated is so shallow that a ship canal twenty miles in length has been necessary to connect it with the deeper water farther west. In addition, the harbor is ice-bound for more than four months each year.

FIG. 365.

St. Isaac's Church in St. Petersburg.

Yet, in spite of all these disadvantages, St. Petersburg is already the largest city in Russia, and the fifth in size in Europe — facts that show how much such a seaport was needed. It is also one of the most magnificent of cities, having especially wide streets, splendid public buildings, and fine residences. More goods are shipped by this route than from any other Baltic port. RIGA, to the southwest, has about half as much shipping.

Odessa. — Odessa, another important port, was founded a little over a century ago, when Russia obtained possession of the northwestern coast of the Black Sea. Since the harbor is rarely frozen over for more than a few days, it possesses a great advantage over St. Petersburg, which it equals in its shipping trade. Besides being the chief outlet for the vast grain trade of southern Russia, and the principal port on the Black Sea, Odessa is an important flour-milling center, like Minneapolis.

Warsaw and Lodz. — Thus far the Russians have found no opportunity to obtain possession of Constantinople, although they have, no doubt, felt many a yearning in that direction. Why? But their progress in the west has not been confined to the establishment of seaports. They have extended their territory in various directions, one of their most important acquisi-

tions being a large part of *Poland*, in which are situated two of the leading cities of Russia, — WARSAW and LODZ. The former is a center for the railways that connect Russia with western Europe, and the latter is an important manufacturing center. Much coal and iron are mined in this vicinity.

Finland, whose capital is HELSINGFORS, although a part of the Russian Empire, has a measure of independence. There is a parliament which makes laws, but the Czar has the right of veto. Unlike the Russians, most of whom belong to the Greek Church, the Finns are mostly Protestants, belonging to the Lutheran Church. Mistreatment by the Russian government has recently led to the migration of many Finns and Poles to the United States. The policy of the Russians is to destroy the nationality of the people.

Russia owns Siberia also, but the ambitious plans of the government in regard to the great Asiatic Empire led the nation into a disastrous war with Japan ending in the utter rout of the Russians. Thus the nation's field of operations in the east was greatly limited.

REVIEW QUESTIONS. — (1) Tell about the size of the Russian Empire. (2) What can you say about its position with reference to the sea? (3) Describe its surface features. (4) Tell about the rivers. (5) Tell about the Caspian Sea. (6) How does the climate vary? (7) Tell about the people. (8) What about the government? (9) Tell about lumbering. (10) What are the principal farm products? (11) What about grazing? (12) What mineral products are found? Where? (13) For what purpose is some of the petroleum used? (14) What is the condition of manufacturing? (15) Tell about each of the cities: (*a*) Moscow — location, comparison with Madrid, importance; (*b*) Nijni Novgorod — location, fairs; (*c*) St. Petersburg — location, surroundings, importance; (*d*) Odessa — location, importance; (*e*) Warsaw; (*f*) Lodz. (16) What are the conditions in Finland? (17) What about Russia's future?

SUGGESTIONS. — (1) Compare the area of the Caspian Sea with that of Lake Superior. (2) Read about how the inhabitants of Moscow burned their houses in 1812 rather than give shelter to Napoleon's army. What followed? (3) What must be some of the difficulties connected with building good roads in southern Russia? (4) What did Kosciusko, the Pole, do to make his name memorable to Americans? (5) Have you read the story of Thaddeus of Warsaw? If so, what can you tell about it? (6) Read how Peter the Great wandered through European countries as a common workman, in order to obtain the benefit of Western ideas. (7) Make a sketch map of Russia, with principal rivers, cities, etc. (8) Compare the area and population of Russia and the United States. Also the degrees of latitude included in the two countries. (9) Where else besides on the Atlantic, Pacific, and Mediterranean does Russia desire an opening to the sea?

For REFERENCE, see *Teacher's Book.*

VIII. GERMAN EMPIRE

Map Questions (Fig. 375). — (1) Compare the latitude of Berlin with that of London. (2) Of New York. (3) Estimate the greatest length of Germany from east to west. From north to south. (4) How does it compare in size with the British Isles? Russia? (5) How much of the boundary is natural? (6) Point out the principal rivers. To what extent do they correspond in general direction? (7) Is most of the surface plain or mountainous? (Fig. 304.) Where are the mountains? (8) What facts do you notice about the coast line? (9) Is the North Sea or the Baltic the more favorable place for seaports? Why?

Extent and Position. — The German Empire contains nearly 209,000 square miles, which is an area a little larger than France and twice the size of Colorado. But it has about 60,000,000 inhabitants, or nearly a hundred times as many as Colorado and 21,000,000 more than France.

The position of this great nation offers a marked contrast to that of Great Britain. Only about one third of its boundary is water, while its frontier comes in contact with seven independent countries, aside from Luxemburg. What are their names?

The location of the British Isles is regarded as favorable for world commerce, inasmuch as densely populated Europe lies near at hand on one side, while the far-away New World is on the other side. The situation of Germany possesses great advantages, also. Owing to her central location, most of the markets of the continent are at her very doors, while two of her principal ports, Hamburg and Bremen, face Great Britain and the West. On the map (Fig. 375) find some of the large cities that can be quickly reached from Germany. In these days of railways Germany's central position is superior to that of England for European trade.

People and Government. — It has required a great struggle, which has lasted through centuries, to bring under one rule the various people within the boundary line of the German Empire. For centuries there was, at best, only a loose confederation to hold them together; and the numerous states which occupied the region were often at war with one another and with surrounding nations. Their

condition was, in some respects, similar to our own during and immediately following the Revolutionary War. There was, however, one important fact to their disadvantage — their meddlesome neighbors helped to intensify the quarrels that arose among them.

During the War of 1866 Prussia and Austria, the principal kingdoms of the *German Confederation*, strove with each other for the exclusive leadership. Prussia proved successful, and Austria withdrew from the union. In 1871 the new *German Empire*, with its present boundaries, was established.

All together there are twenty-six states within the Empire, some of them being *kingdoms*, some *duchies*, and some merely *free towns*. The smallest of all is the city of BREMEN, occupying only ninety-nine

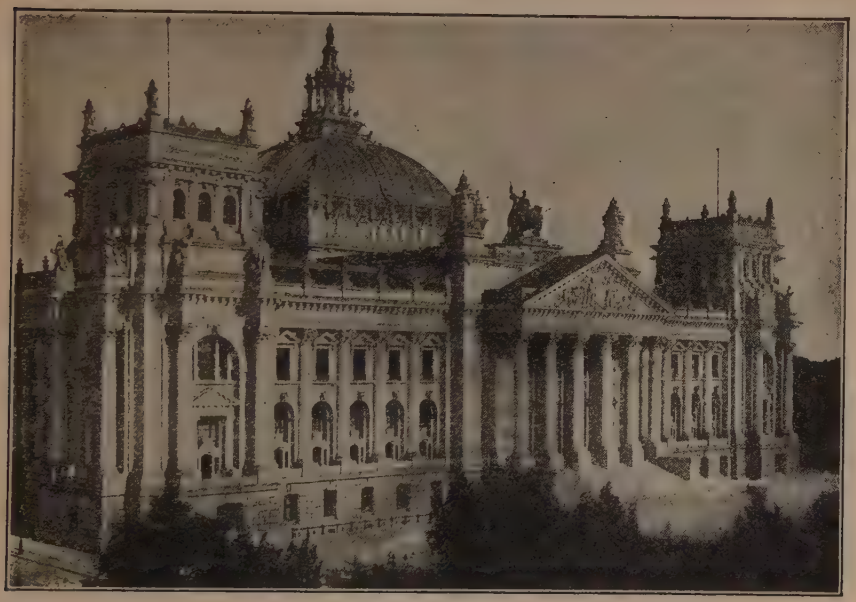


FIG. 366.

The German *Reichstag*, corresponding to our House of Representatives, meets in this building, in Berlin. The other legislative branch, called the *Bundesrath*, is composed of members appointed by the various German states.

square miles, while Prussia, the largest, contains more than one half of the entire empire, and in 1897 had a population of about 32,000,000. They are all united under a central authority, more closely and less independently than our states. In place of a President they have an Emperor (the King of Prussia being by law the German *Emperor*), and their

form of government is a constitutional monarchy (Fig. 366). However, the power of the Emperor is much greater than that of the British King, though less absolute than that of the Russian Czar.

Defense. — The Germans in a war with France in 1870 not only defeated the French, but compelled them to pay a large sum of money. At the same time they seized the French territory west of the Rhine, called Alsace-Lorraine, in which Metz and Strassburg are situated. This is a suggestion of the way in which much of Germany's irregular frontier line has been determined. To a great extent mountains form the southern boundary, and water the northern; but the eastern and western limits, largely decided by war, do not follow any natural barrier. Draw an outline map of Germany.

In order to preserve her present boundaries, Germany must be prepared to defend them at any time. This need calls many citizens to an occupation which we have not thus far considered, namely, that of *preparing for war*.

It is a fact that each of the great European nations is jealously watching the other; and as no one of them knows how soon a dispute may arise with its neighbor, each maintains a large and thoroughly equipped army. The object of each is to be so dangerous that others may fear to offend or attack it; and if once involved in war to come off victorious.

For such reasons all able-bodied young men in Germany are required to devote usually two full years and parts of several succeeding years to active military training. Most of them enter the service at about the age of twenty; as there are about four hundred thousand males arriving at that age every year, one can obtain some idea of what it costs a European nation to have close neighbors. The peace footing of the German army is almost six hundred thousand men, which is larger than the number employed in all the mines of the British Isles. In addition to this, the German navy calls for many recruits. As all these men are, for the time being, withdrawn from industrial pursuits, the nation loses the fruits of their labor for that period. Thus the productiveness of the nation is reduced.

Extensive fortifications are built near the boundary, as at Cologne, Metz, and Strassburg on the French side, and Königsberg and Posen near Russia. They are also numerous in the neighborhood of the great interior cities, and at strategic points here and there. The expense of these fortifications, and the vast sums required to keep up the army and navy, form a heavy drain upon the nation.

Germany is not unlike the other European nations in these respects. As already stated (p. 343), the British, having no immediate neighbors, rely mainly upon their powerful navy for defense. But every one of the

Great Powers is calling for many men, and expending large sums of money either for the army or navy, or both. In fact, preparation for war is one of the greatest occupations of Europe to-day.

Physiography. — Germany consists of two quite different parts. The southern section is mainly a mountainous region of ancient date, and is therefore worn low, like the mountains of Great Britain and New England. It is, in fact, a plateau from one to two thousand feet in height, with some ranges, like the Erzgebirge, rising high enough to be commonly classed as mountains. Only in the extreme south, on the edge of the Alps, is a great altitude reached, one peak being nearly ten thousand feet above sea level.

Valuable minerals have been revealed by the wearing away of these ancient mountains; indeed, the mineral belt of southern Belgium and northeastern France is but a continuation of the highlands which cross southern and central Germany.

Northern Germany is a lowland, broadening toward the east until it merges into the plains of Russia. In the neighborhood of Holland the plain is very low and flat (Fig. 367); but in most places, owing to the irregular deposits left by the Scandinavian glaciers, it is rolling. Elevations in this part of Germany rarely exceed six hundred feet. This plain is, in large part, in-

FIG. 367.

A view on the level plain of North Germany.

cluded in Prussia, the greatest and most powerful of the German kingdoms.

Name and trace the courses of four large rivers which flow northward. Which is the most important?

Climate. — The average yearly rainfall is about twenty-eight inches, decreasing toward the east to about twenty inches near the

FIG. 368.

A view on the Rhine at Bingen. Notice the opposite bank, where the earth has been terraced so that even the hill slope may be used for vineyards.

Russian border. That these figures may be better appreciated, we may recall the fact that the average rainfall in most parts of the United States east of the Mississippi River is over forty inches.

Note the number of degrees of latitude included in Germany. Nevertheless, owing to the difference in elevation, the southern plateau is about as cold in winter as the northern lowland. In summer, however, the southern part is warmer than the northern. But the valleys of the south, being low and inclosed, are warmer than the northern plain both in winter and in summer, and are therefore capable of producing such crops as tobacco and grapes.

The increase in extremes of temperature toward the east, or away from the ocean, is illustrated on the coast. The North Sea is almost free from ice, while the Baltic ports are frozen over for a time; and the farther

east they lie, the longer their trade is arrested by the cold. What must be some of the results of this fact?

Forests. — That the mountains of Germany are low enough to be well wooded, is indicated by the frequent use of the word *wald* (the German for wood) in the mountain names. Where the soil is poor, as in the stretches of sand deposited during the Ice Age, much of the lowland is also wooded. All together about one fourth of the surface of the empire is covered with trees.

The tendency of the German people to useful and sensible economy is well illustrated in their treatment of the woodlands. Instead of wantonly devastating them by fire and the ax, — as has been done in so many parts of our own country, — they maintain an excellent system of forest culture. Trees are planted in place of those that are cut for timber, these are given proper care, and thus the woods continue to be abundant. By this system, also, forest culture becomes profitable. It is partly due to the encouragement received from the success in Germany, that national forests have been established in various parts of the United States, and schools of forestry founded, as in New York, for the purpose of studying how to care properly for our woods.

Agriculture and Grazing. — On the whole, Germany has not a fertile soil; but the farm products are very extensive, because the people are both industrious and intelligent, and their method of cultivating the soil is excellent. What countries may well be contrasted with them in this respect?

More than one third of the population are dependent for their living upon agriculture, the leading industry of the nation. Germany is one of the most important grain-producing countries of Europe; but here rye replaces wheat as the principal grain. Potatoes, introduced from America, are raised in such quantities that, like rye, they form one of the principal foods. These two crops are extensively cultivated, both because they are a cheap food, and because they flourish in the light soil and cool summer climate, characteristic of so much of Germany. Sugar beets, hay, oats, and barley are other important crops of the northern plains, while in the Rhine and other warm, sheltered valleys of the south, hops, tobacco, and grapes are raised in large quantities.

Since much of the lowland is too sandy for cultivation, and much of the highland too rugged, it is not surprising that one sixth of all the surface consists of natural pasture. Cattle for beef and for dairy purposes

are kept in nearly all parts of the empire, but especially in the damper climate of the west.

Mining. — Next to Great Britain, Germany is the greatest mining country of Europe; and, as in the United Kingdom, her most valuable minerals, coal and iron, often occur in the same region. Germany and Belgium together produce more zinc than all the rest of the world; and nearly half the silver obtained in Europe is mined in Germany. Much lead and copper also come from Germany.

Fig. 369.

Storks at Strassburg, — a familiar bird in Germany which builds nests on the chimneys.

This country resembles our own in the wide distribution of its coal beds. The coal fields that were found in Belgium and northeastern France (p. 357) extend into Germany in the neighborhood of Aachen; and from this point eastward to the Russian border there are several important coal fields.

There are also immense salt mines, as at Stassfurt, northwest of Halle, from which are obtained not only table salt, but products used in the manufacture of soap, in dyeing, bleaching, glass making, and calico printing. The Germans employ thoroughly scientific methods in their mining work; and it is from them that other nations have learned many of the methods which are employed in reducing ores to metal.

Manufacturing. — From the above facts we may expect to find Germany a great manufacturing country, with her manufacturing centers well distributed. Explain why.

About a third of the inhabitants are dependent upon manufacturing, and in recent years Germany has so advanced in this industry that she now ranks next to the United Kingdom in the quantity and excellence of her goods.

The distribution of the coal and iron gives the key to the principal

centers for iron manufacturing. The busiest section is along the Rhine, in the vicinity of COLOGNE, which may well be compared with northern England in the extent of its industries. A second center is about DRESDEN and CHEMNITZ, and a third at BRESLAU in the southeastern corner of the empire. As in other countries so far studied, the textile industries are best developed near the coal fields. Therefore the sections mentioned above are distinguished for cotton, woolen, and silk factories as well as for iron.

The extensive forests partly account for a third occupation of many sections; namely, the manufacture of furniture, paper, and other articles made of wood.

The map (Fig. 375) shows no cities south of BRESLAU; yet a busy manufacturing center exists there. The explanation is that the people carry on this work largely in their own homes, instead of in factories. Living in a hilly country, where agriculture is not very profitable, they spin and weave the flax and wool raised near by. They also make lace and carve wood; but, although villages stretch for miles along the valleys, there are no large towns.

The manufacture of spirituous liquors is another prominent German industry. A portion of the immense potato crop is made into spirits, and also some of the beets. But beer, in which barley and hops are used, is the common beverage. From the grapes of southern Germany much wine is manufactured, though not nearly so much as in France.

For a long time nearly all sugar was obtained from sugar cane, although maple trees supplied a small amount; but German chemists found a means of extracting sugar from beets. By improving the process, and by developing the beets until they contained more sugar, the great industries of sugar-beet raising, and the refining of beet-root sugar, have been made possible. Each year this source of sugar has been proving a more formidable rival to sugar cane, until now a large part of the sugar consumed in Europe, and much of that used in North America, is obtained from sugar beets. One important reason why this industry has thrived is that sugar beets grow in a cool, temperate climate where population is dense and markets are numerous.

Formerly Germany had to rely upon foreigners for sugar; but since the development of this industry, beet sugar has become one of its greatest exports. Nevertheless, the population is so dense and so many are engaged in manufacturing, that, like the British, the Germans cannot raise all the food they need. Therefore much food, such as wheat and meat, as well as raw materials for manufacture, such as cotton, wool, and silk, must come from abroad.

Germany's Rapid Advance. — No European country in the last

quarter of a century has experienced such rapid growth as Germany. For example, in the twenty-five years preceding 1895 her increase in population was over 11,000,000, while France had an increase of only 2,500,000. The empire has had a corresponding gain in wealth.

Undoubtedly the strong central government established in 1871, and with it the laying aside of the petty jealousies that paralyzed industries, is one cause of this advance. But there are many other causes, of which one of the most influential is education and the encouragement of science. Every German child is forced by law to attend school; and careful attention is given to the study of the various industries, foreign products, languages, etc. In the higher commercial and technical schools young men obtain excellent preparation for various kinds of business, while in many other countries there is little or no provision for such education.

The value of scientific work is fully recognized and encouraged by the government; and that such encouragement is profitable to the nation is proved by the wonderful development of the sugar industry, the mines, and the factories. Not many years ago much of the manufacturing was done by hand; but now the best machinery has been introduced, and Germany is one of the three leading manufacturing nations of the world. Name the other two.

Colonies and Emigrants. — The recent acquisition of foreign territory is an indication of the growth of Germany. The empire is now in possession of extensive areas in the island of New Guinea, north of Australia, and in both east and west Africa, as well as smaller colonies elsewhere (Fig. 354).

Many Germans have emigrated to various parts of the New World. Fully five million emigrants have come to the United States within the last seventy-five years, while the British Isles have sent us not quite seven million. Naturally many of the German emigrants to other countries have kept up trade with their *fatherland,* and have thereby increased the commerce of Germany.

Principal Cities and their Commerce

After the preceding statements, it may not be surprising to learn that the leading German cities have experienced as rapid a growth as those of America. In the twenty years between 1870 and 1890, for example, Berlin had a more rapid growth than New York, and added as many actual new residents as Chicago. In 1875 Boston had almost a hundred thousand more inhabitants than Hamburg; but

now Hamburg has two hundred thousand more than Boston. Other German cities have increased, and are still increasing, in population at much the same rate.

Berlin. — The position of Berlin, on a small river (Fig. 374) on the North German plain, midway between the coast and the highlands, may not at first seem advantageous. But the Oder and some of the tributaries of the Elbe approach so near each other in this section that they have easily been united by canal. Thus Berlin has water connection with both HAMBURG and STETTIN, as well as with

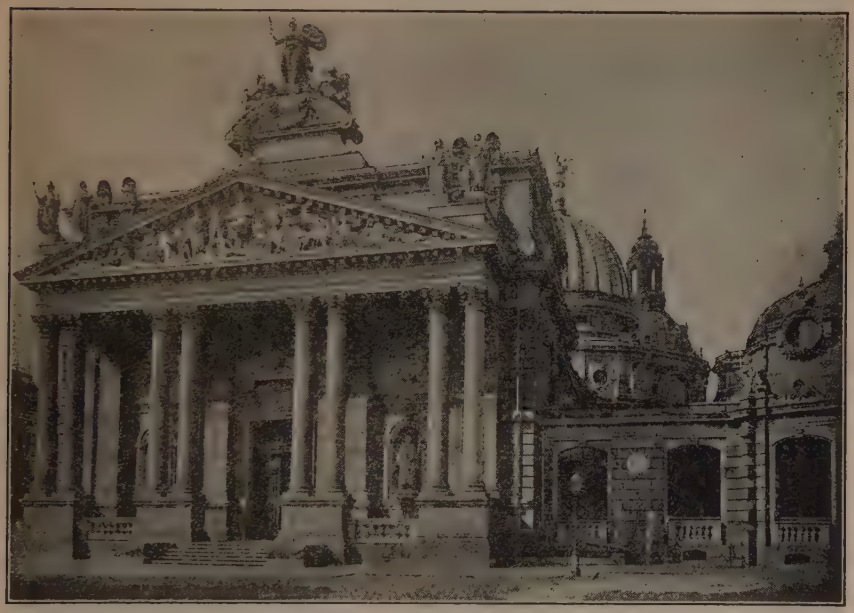


FIG. 370.

The Dresden Art Museum.

all parts of these two river systems, — a very important aid in obtaining fuel, food, etc., for the city. Observe also (Fig. 375) that Berlin lies on the direct route from Hamburg to Breslau, and from Stettin to Leipzig, and that other large cities surround it. It is, moreover, on the route of several great European railways, and is therefore one of the important railway centers of the continent.

With such excellent connections, by water and by rail, Berlin has naturally become one of the great manufacturing cities. Fully half the residents are supported by this industry, which includes brewing, the manufacture of fancy articles, clothing, machinery, etc. Besides

being the capital of Prussia and of the German Empire, Berlin is the center of German banking. It is noted for its art and music, and for its great university, the largest in the empire. There are a number of suburbs, one being POTSDAM (Fig. 374), the German "Versailles," in which are located several royal palaces.

Interior Cities near Berlin. — Among the cities not far from Berlin is LEIPZIG, the fourth largest in the empire. It is situated at the junction of two small streams, at a point where roads from the highland meet those from the lowland. Formerly it was a center for wagon roads, and now it has naturally become a railway center. Owing to its favorable position, Leipzig is, next to Berlin, the most important trade center of Germany. One of its leading articles of commerce is fur. It is the seat of a noted university, and a center for the German book trade.

DRESDEN, southeast of Leipzig, is noted for its art museum (Fig.

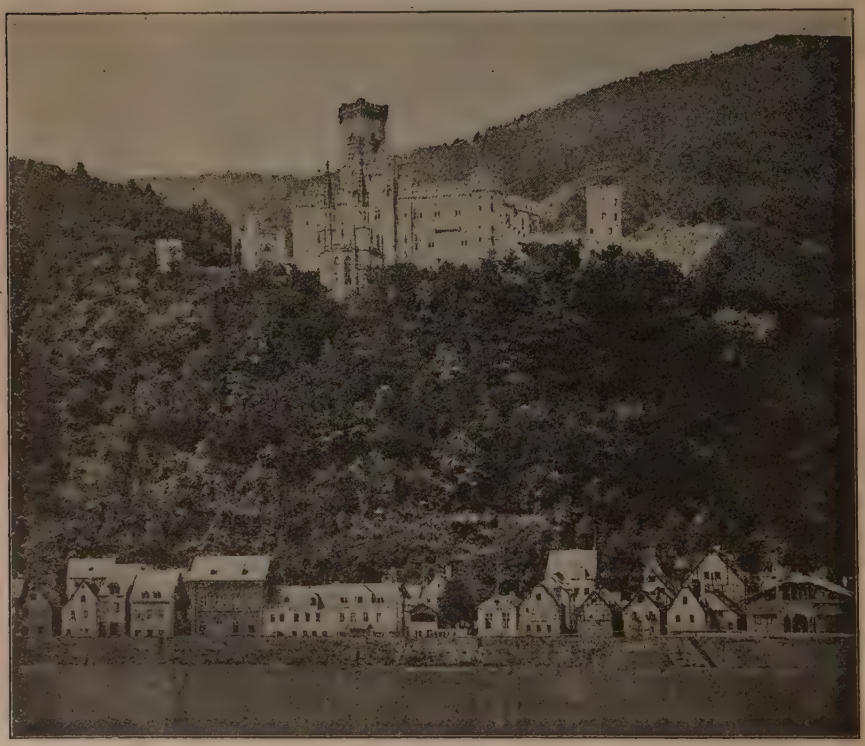


FIG. 371.

A castle on the Rhine

370), which rivals the Louvre of Paris. The beautiful Dresden china is made in this vicinity, and in recent years much manufacturing has developed, for Dresden is situated on a navigable river and has coal near at hand. It is, moreover, the capital of Saxony, the most densely settled German state.

Seaports. — HAMBURG, which is rapidly growing in population, is the second city in Germany and the most important seaport on the continent. The reasons for this are clear when it is known that the estuary of the Elbe (Fig. 375) makes an excellent harbor, usually free from ice, and that Germany has an extensive foreign trade. Name some articles which that port probably receives from the United States. What water connections has Hamburg with the interior?

BREMEN and STETTIN also admit large vessels, and are the chief rivals of Hamburg; but they together have less than one half as much commerce as Hamburg. In what respect are they less favorably situated for commerce than Hamburg?

Name other Baltic ports besides Stettin. Which is a natural outlet for wheat from Russian Poland? Estimate the distance saved to the Baltic ports by the construction of the Kaiser Wilhelm canal, which is sixty-one miles in length.

FIG. 372.

The Cologne Cathedral, one of the most beautiful Gothic edifices in the world, was begun in 1248 and completed in 1880.

Cities along the Rhine. — On ascending the river into Germany we come to the great manufacturing region already mentioned (p. 397). What cities are there? COLOGNE, the largest, with a

population of more than a third of a million, is on the river bank. It is a great shipping point, since railways cross the river, and boats from London and other places are able to ascend to this point.

Elberfeld and Barmen have textile manufactories; Essen is famous for the Krupp steel works; Krefeld is an important silk manufacturing town; Aachen (Aix-la-Chapelle in French) manufactures woolen cloth.

Just beyond the great bend in the Rhine is Frankfort, on a navigable tributary, the Main, along which lies the easiest route from the Rhine valley to the Danube. Since the railway from the German

Fig. 373.

A scene in Frankfort.

plain to the upper Rhine passes Frankfort, it is a center of important trade routes, and therefore one of the leading trading and banking centers in western Germany. It has long been a prominent city and was the capital of the old German Confederation (p. 390).

Railways to the Danube pass through Munich, the capital of the kingdom of Bavaria. Although so far to the south, and so distant from coal, Munich is the third city in size in the realm. It is on the trade routes from Germany to Italy and to Austria, and is accord-

FIG. 374.

Berlin and vicinity.

FIG. Y.

A deep, narrow gorge in the Alps. There are potholes just above the path on the left, showing that the stream bottom was once at that level. This gorge is being rapidly deepened.

IX. SWITZERLAND

Physiography and Climate. — This is a very mountainous country (Figs. 375–379), for the Jura Mountains are on the northwestern border, while the Alps occupy the southern half. Between these two mountain systems, which extend northeast and southwest, is a low, hilly plateau, from one to two thousand feet in altitude. About one third of Switzerland is included in the plateau belt. In so rugged a country one would not expect to find a large population; yet Switzerland is almost as densely settled as France, and much more so than the state of New York.

FIG. 376.

A glacier in the Swiss Alps.

It is evident that the temperature of this mountainous country must be low, and that it must vary greatly with the altitude. This is well illustrated in the Alps, at whose base are found chestnut and walnut trees, which are replaced higher up by beech, maple, and other trees of the cool temperate zones, and still higher by a belt of evergreens. Above these come dwarfed trees, shrubs, grass, etc.; and higher still, at an average elevation of about nine thousand feet above sea level, the snow line is reached.

The numerous lofty mountains, rising in the path of the prevailing westerlies, cause Switzerland to be one of the wettest countries on the con-

tinent. On the higher mountains much snow falls, and as this does not all melt in the summer it slowly accumulates in the upper valleys to produce streams of ice, or *glaciers* (Fig. 376). These move slowly down the valleys until they reach a point below the snow line where the ice melts. They there deposit terminal moraines, which, though smaller, resemble the moraines made by the continental glaciers of the Ice Age (p. 14). The Rhone and many other rivers are supplied with water by the melting of the Alpine glaciers.

People and Government.— People who dwell among mountains develop a spirit of independence, as is illustrated by the story of William Tell. Thus we find that, as early as 1291, an agreement was made among a few of the small Swiss states, or *cantons*, for mutual protection against oppression. Many a time since then foreigners have attempted to conquer the Swiss; but, aided by the difficult approaches to their country, and by the mountain fastnesses to which they could retreat, they have been able to maintain their freedom, although the entire area of the country is only one third that of Pennsylvania. Their twenty-two cantons, united somewhat as are our own states, now constitute a republic, the neutrality of which is guaranteed by the Great Powers of Europe.

Fig. 377.

A Swiss peasant costume.

But while there is one stable government there is not one common language. The country is most open toward the north, for the plateau of Switzerland merges into that of Germany. Naturally, therefore, German-speaking people are most abundant, making up 72 per cent of the population. The approach from France is much more difficult, and the French population constitutes only 22 per cent of the whole, while but 6 per cent speak Italian.

Farming. — Owing to the mountainous condition, only one acre in nine is fit for the plow. Yet agriculture is the principal industry. On the lower lands grain, grapes, and the silkworm are raised, as in the neighboring countries; and on the lower mountains dairy farming is important, as might be expected. The population is so dense, however, that much food must be imported, though some products, such as cheese and condensed milk, are exported.

Manufacturing. — Switzerland is very poor in mineral deposits, and coal is entirely lacking. This scarcity of raw materials would suggest that there is little manufacturing, but the inference is false. That the Swiss possess marked mechanical skill is indicated by the remarkable wood carving for which they have long been noted. Like New Englanders, in spite of the absence of coal, cotton, and ore deposits, they have engaged extensively in the manufacture of light articles, such as textile goods, jewelry, etc.

FIG. 378.

A view of Lake Lucerne. The wall on the left bounds a road which is cut in the rock on the mountain side.

The commercial position of Switzerland is advantageous, since it is entirely surrounded by densely populated countries which supply raw materials and furnish a market for manufactured goods. The influence of the latter fact upon the cities is very marked.

Leading Cities. — The largest city, ZURICH, on Lake Zurich, is an important railway center. The St. Gothard railway, which runs northward from Genoa and Milan, connects the city with Italy, while other railways bring it in touch with France, Germany, and Austria.

These roads are especially important for the introduction of foods and raw materials for manufacture. Therefore Zurich is the center of one of the principal manufacturing districts, and is itself especially noted for the manufacture of silks, cotton, and machinery.

The *St. Gothard Tunnel* (Fig. V), from which the railway takes its name, is a marvel of engineering skill. Before reaching the main tunnel several smaller ones are entered, through which the train winds in a spiral course, so that once or twice a passenger comes out of the mountain almost directly over the point where he entered it; and in some cases he can see far below him two places, one above the other, at which the train entered to follow its spiral course in the mountain rock. This is made necessary because the grade is so steep that a train could not be drawn directly up a straight track. The main tunnel, which is nine and one fourth miles long, is quite straight. The *Simplon Tunnel*, a short distance west of the St. Gothard, also connects Switzerland and Italy, and has a length of twelve miles. These tunnels, giving access to the raw-silk market of Italy, have aided in developing silk making, the chief manufacturing industry of Switzerland.

FIG. 379.

The Matterhorn peak, one of the steepest in Switzerland.

BASEL, which forms the second center of population in Switzerland, is the busiest railway point in the country. It is on the main line of the St. Gothard railway, and on the Rhine where it enters Germany from Switzerland. Why is its position, near both France and Germany, favorable to manufacturing?

GENEVA, situated on the southwestern end of Lake Geneva, where the Rhone enters France, is a noted educational center. It is on a very ancient and important trade route from southern France to Germany (p. 362), and therefore has excellent railway connections.

Water power is much used in generating electricity for use in manufacturing, and the city makes jewelry and scientific instruments.

BERNE, the capital, is centrally located; but it is a small city because its situation for commerce is not favorable.

Scenery and Tourists. — Many of the Swiss cities are beautifully situated upon lakes, and within sight of mountain peaks always covered by snow. LUCERNE, for example, is surrounded by most beautiful and varied scenery. The city is located upon Lake Lucerne, and lofty mountains rise in the immediate neighborhood (Fig. 378). Mts. Rigi and Pilatus

FIG. 380.

Lake Geneva, in a valley among the Alps. The Rhone River flows out of this lake.

are near by, and from their summit one obtains a magnificent view of the lake, bordered by green meadows and numerous villages, over four thousand feet below; while in several directions, as far as the eye can reach, are the crests of stupendous, jagged mountains. The roads of Switzerland (p. 410) are famous as examples of engineering skill, and of the wonderful enterprise of the people. On account of its scenery Switzerland is the most noted summer resort of Europe.

REVIEW QUESTIONS. — (1) What are the principal physiographic features? (2) How does the temperature vary? (3) What about the rainfall? (4) Tell

about the glaciers. (5) Give reasons why the Swiss have been able to maintain their independence. (6) What about their language? (7) What about raw materials? (8) Give reasons for the development of manufacturing. (9) For what is Zurich important? (10) Tell about the St. Gothard Tunnel. (11) Tell about (*a*) Basel, (*b*) Geneva, (*c*) Berne. (12) Why do so many tourists visit Switzerland?

Suggestions. — (1) What other factors besides altitude cause great variety of climate in Switzerland? (2) How may the lakes act as filters and regulators for the rivers? (3) The Rhone enters Lake Geneva laden with sediment derived from the glaciers; but it leaves the lake clear of sediment. By such deposits extensive deltas are built in all of the lakes. Of what value is that fact? (4) What special reasons are there for giving particular attention to the study of English and other foreign languages in the Swiss schools? (5) Why has Switzerland, unlike many European countries, not come into possession of colonies? (6) Find the meaning of referendum and popular initiative in Swiss legislation. (7) Why should Switzerland be selected as a place of refuge by persecuted people and political refugees from other nations? (8) Read that portion of the story of William Tell which is supposed to have occurred about Lake Lucerne.

Fig. 381. — A mountain road rising up the slopes of the Alps to one of the passes. The Rhone glacier is seen in the middle of the picture. Notice the stream that issues from it, and flows with numerous branches, or with a braided course, over the sediment that it brings from the ice.

X. ITALY

Map Questions (Fig. 375). — (1) Of what does the shape of Italy remind you? (2) How does its latitude compare with that of Spain? (3) What neighboring islands belong to it? (4) Point out the principal river. (5) How are the lofty mountains in the north likely to affect the climate? (6) What countries border Italy? (7) What seas border the peninsula? (8) How does its position seem to be advantageous for commerce?

Extent and Position. — Italy is "the very heart of the Mediterranean lands, and plays a great part as a link in the chain of communication between northwestern Europe and the Far East." For example, mails from London to India go by rail to Brindisi in southeastern Italy, and thence by steamer. What countries in Africa lie nearest to Italy? (Fig. 443.) Estimate the distance to them.

The area of Italy, including the islands of Sicily and Sardinia, is only a little greater than that of Colorado, but its population is about 32,000,000. It is the smallest of the six Great Powers, but is the most densely populated of any except the United Kingdom. Name the Powers.

People and Government. — The inhabitants of Italy are a mixture of many peoples. In early times, the central position of the Italian peninsula was of importance in aiding the government at Rome to control the lands bordering on the Mediterranean Sea. At that time people from the surrounding lands of Europe, Asia, and Africa were brought to the peninsula, often as slaves captured in war. Later, when the power of the Roman Empire was weakened, hordes of barbarians invaded Italy. Nevertheless, the permanent settlers have invariably been won over to one language; and Italian, which is a growth out of the Latin of the ancient Romans, is now the universal tongue.

For centuries Italy was broken up into a number of separate and independent kingdoms; but here, as in other countries, the tendency of recent times has been toward unity. In 1860 several of the independent states united to form the kingdom of Italy; and later others were added, until, in 1870, or about the same time that the German Empire was formed (p. 391), the present kingdom was established with Rome as its capital. Like most of the European countries, Italy is governed by a limited, or constitutional, monarchy.

Physiography and Climate. — The Italian peninsula is mountainous throughout most of its extent. In the north are the Alps, some of whose highest peaks are on the boundary line between Italy and Switzerland. The Alpine ranges curve around in northwestern Italy and join the Appennines, which extend the entire length of the peninsula and form its very backbone. The principal lowlands, therefore, are the narrow coastal plains and the broad Po valley.

We think of Italy as a sunny land of flowers, although Milan and Venice are on nearly the same parallel as Montreal. One reason for the pleasant climate is that the lofty Alps form a great wall which cuts off the cold north winds. Another reason is that the peninsula is under the equalizing influence of the Mediterranean, whose waters have a temperature of over 50°. On these accounts the Italian winters are mild, and in the extreme south the temperature seldom falls to the freezing point.

Fig. 382.

An Italian team at Naples.

Much of Italy has an abundance of rain; but, except in the north, the greater part comes in winter. The summer drought is due to the fact that the horse-latitude belt moves northward in summer (p. 248); therefore southern Italy at that season resembles southern Spain in climate.

Agriculture. — Such a climate, together with a fertile soil, helps to explain why agriculture is the principal industry in Italy. Among the products are many that thrive in semi-tropical climates, as well as others that are common in the countries of northern Europe. The climate is so favorable that, by the aid of irrigation, from four to ten crops may be raised in a year.

The most extensive farming district is the fertile plain of the Po basin. There is an abundance of rainfall; yet the people depend upon irrigation more extensively than in any other part of Europe. There are several reasons for such extensive irrigation. In the first place, the fact that the tributaries have their sources in the mountains, and often in the glaciers and snows of the Alps, insures a permanent supply of water to the gently

sloping land. Besides this, the rivers frequently flow through lakes — some of them among the most beautiful in the world — which act as great reservoirs for water supply.

Where irrigation is so easy, the extensive cultivation of rice is possible. This is an important crop in northern Italy, but corn and wheat are raised in still greater quantities. Grapes are cultivated to such an extent that Italy ranks second among the wine-producing

FIG. 383.

A herd of goats in the streets of Naples. These are driven about the city, and even into the houses, to be milked.

countries of the world; and so many silkworms are reared that raw silk is the most valuable export of the country. Among the other important products are eggs, which are exported in large quantities; also olives, oranges, lemons, flax, hemp, and wool.

Mining and Fishing. — There is a little iron, zinc, and copper ore; but one of the most important mineral products is the sulphur of Sicily; indeed, until a few years ago this island produced most of the sulphur used in the world. Another important mineral product is marble of such rare beauty that it is prized the world over.

The fishing industry is important. Among the peculiar products of the sea are precious coral and sponges. You will remember that we found sponge fishing important also among the Bahama Islands east of Florida.

Manufacturing. — As in Switzerland, electricity generated by water power supplies the place of coal to some extent. Consequently there is more manufacturing than one might infer from the lack of fuel. While much raw silk is produced, and there is some silk manufacturing, a large part of the silk is sent to France, Switzerland, and elsewhere, to be made into cloth. There are also factories for woolen, cotton, and flax weaving, and for other purposes.

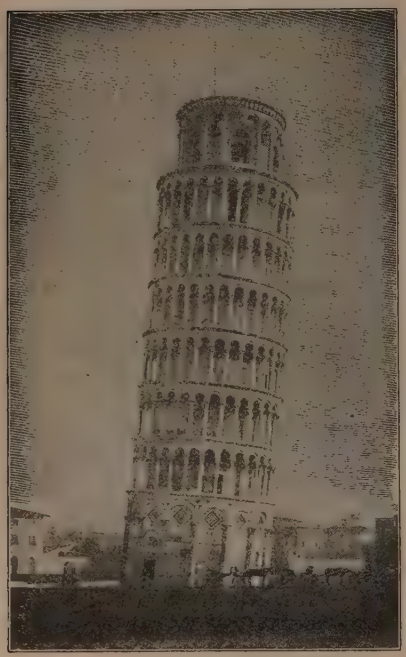


FIG. 384.

The leaning tower of Pisa, which has become tilted because of settling on one side.

Most European countries take pride in their fine art galleries; but Italy far surpasses them all and is the very storehouse of art, whether architecture, painting, or sculpture be considered. Accordingly, the characteristic manufactured articles are those of an artistic nature, as glass work, lace, earthenware, statuary, wood carving, coral carving, and straw plaiting. In what other country have we found that the artistic taste of the people greatly affects their manufactures?

Principal Cities. — Estimate the average width of the Italian peninsula. Since it possesses many excellent harbors, we may expect to find numerous large cities along the coast, as in Great Britain.

Naples and Vicinity. — The most populous city is NAPLES, in the southern part of the peninsula. The semi-circular bay on which it is situated presents one of the most magnificent sights in the world. On the northwest is the city itself, rising, street above street, upon an amphitheater of hills; toward the east is Mt. Vesuvius (Fig. 385), with the crests of the Appennines in the distant background; and on the southeast is a steep, rocky coast, behind which are numerous villages partly concealed among groves of orange, lemon, and palm trees.

This is one of the most fertile sections of Italy, — thanks to the ashes that have been thrown out of Vesuvius, — and the agricultural population is one of the densest in Europe. The harbor, too, is good, so that there

is more shipping here than in any other Italian port with the exception of Genoa. But the secret of so large a city in this agricultural region is found partly in the peculiar character of the Italians, who feel a dread of isolated homes such as are common throughout the farming districts of the United States. Consequently they crowd into the villages and cities, even though they must travel a long distance to their field of work, or must suffer now and then from extreme want.

Within plain sight of Naples stands Mt. Vesuvius, a cone of lava and ashes nearly a mile in height, from the crater of which volumes of steam constantly pour forth. At the time of Christ the slopes of this mountain were dotted with productive farms, while thriving towns spread over the country at its base. But in the year 79 an appalling eruption took place

FIG. 385.

A view of Vesuvius, with a part of Pompeii in the foreground.

which completely buried Pompeii, Herculaneum, and many villages beneath showers of ashes and streams of volcanic mud. Since then many eruptions have been recorded, the last violent one occurring in 1872. During the last half century the buried cities, especially Pompeii, have been unearthed at great labor and cost. By these excavations much has been learned about the buildings and customs of the people who lived nearly two thousand years ago.

At present, tourists daily ascend to the top of Vesuvius. There they see one of the most awful sights in the world when they cautiously approach to the very edge of the crater — an opening perhaps a fourth of a mile across — and peer down into the abyss. Reports like the thunder-

ings of cannon come from far below, and lumps of lava as large as a man's head are often hurled upward. Not seldom lava lumps rise above the mouth of the opening and fall here and there outside, making one's visit all the more exciting by the slight danger of being hit.

Ancient and Modern Rome. — By far the most interesting spot in Italy is ROME, the "Eternal City," long the capital of the ancient world, afterward of the empire of the Popes, and now of Italy.

The site of Rome was well chosen. It lies near the center of the Mediterranean, and near the center of the Italian peninsula as well.

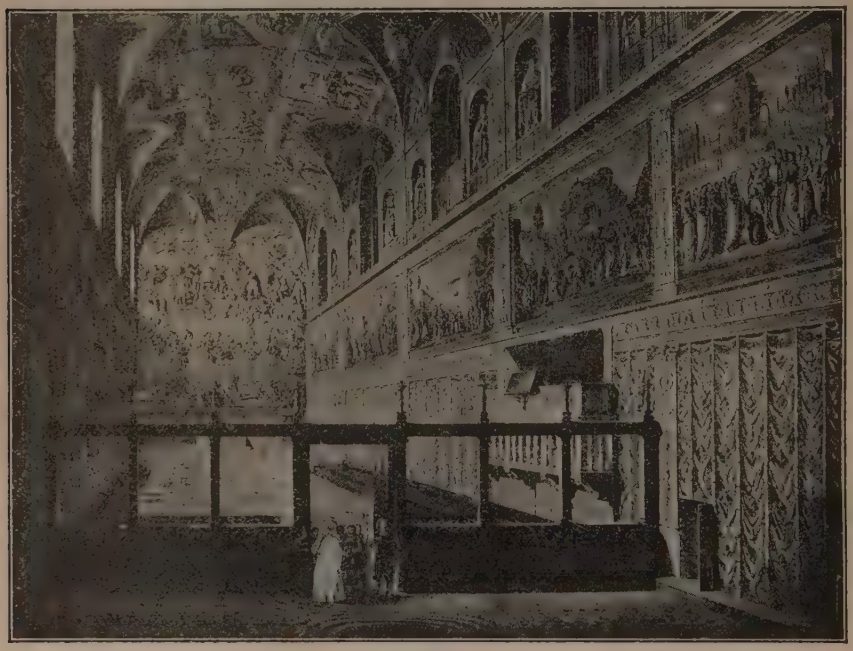


FIG. 386.

The Sistine Chapel, in the Vatican, where the Pope lives.

In that part of Italy the fertile coastal plains are broad and are intersected by the Tiber, the largest river of the country except the Po. In that vicinity, also, the Appennines reach their highest altitude, which insures abundant water supply for the Tiber and for the plains. Moreover, the valley of the Tiber offers one of the most convenient routes across the peninsula. These are some of the advantages that attracted to ancient Rome a population of fully a million, and caused the surrounding country to be thickly settled and carefully tilled.

Now, however, the city contains less than half as many inhabitants, while the neighboring plains for miles around, though beautiful pasture land, have scarcely a tree or a house upon them. The reason for this lack of suburban life is the very prevalent malaria. At present, the country is of use for little else than grazing; and as summer approaches even the herdsmen flee with their cattle and sheep to the mountains.

But while agriculture and commerce do not flourish near Rome, fine residences, public buildings, art galleries, and notable ruins are numerous in the city. The dome of *St. Peter's* — the largest and most famous church in the world — towers above everything else; and the *Vatican*, where the Pope resides, is the largest palace in Christendom. In the Vatican are some of the finest and most beautiful of paintings (Fig. 386).

FIG. 387.

Ruins of the Colosseum, at Rome.

The ruins of ancient Rome vie in interest with these products of later Rome, and cover so many acres that the city is almost as much a tomb as a living city. The most conspicuous relic of the past is the *Colosseum* (Fig. 387), a huge, oval-shaped theater, open to the sky, with seats for forty or fifty thousand persons. In the days of the Roman Empire it was used to witness life and death struggles between men, and between men and wild beasts.

The *Forum* is another extensive ruin within the city limits. It was the great public square, on a lowland between some hills; but its monuments, arches, and other ornaments were covered with rubbish during the centuries succeeding the fall of the Empire. The excavation of this famous spot has not yet been completed, whole buildings, as well as smaller objects, having been buried in that locality.

Other Italian Cities. — With the exception of Rome and Naples the large cities of the Italian peninsula are in the northern part.

The principal city south of Naples is PALERMO, the capital of Sicily. It is situated in the midst of extensive fruit groves. What fruits would you expect to find there?

The first large city north of Rome is FLORENCE, on the western base of the Appennines, at a junction of roads across the mountains. Straw plaiting, mosaic work, and silk manufacturing are important Florentine industries; and the city is famous for its art galleries.

MILAN, the leading city of northern Italy, owes its importance to its location at the crossing of roads running east and west in the Po valley, and north and south over the Alps. TURIN has flourished for a similar reason. From very early times these cities have been important trade centers because of their position at the crossing of trade routes in a fertile, densely populated valley. The railways across the Alps (p. 408) have greatly increased their importance.

MILAN possesses a magnificent cathedral built of white marble and adorned with more than a hundred spires and fully four thousand statues. On the wall of an old monastery in Milan is Da Vinci's famous painting, "The Last Supper," copies of which are often seen in our homes. The city is the center of the silk trade, and manufactures much cutlery.

GENOA, although separated from the Po valley by the low Appennines, is the natural port of Milan and Turin. Since it is a port of outlet for so fertile a region, and is now connected with cen-

FIG. 388.

A view of a part of Venice.

tral Europe by railway (p. 408), this city is the most important seaport in Italy.

The principal seaport of the Adriatic is Venice, one of the most interesting European cities. When hordes of barbarians were invading Italy, some of the residents retreated to a number of small islands in a lagoon, protected from the sea waves by low sand bars. The people developed into a hardy independent race, largely through contact with the sea. Their very position forced them to become sailors; and the site of their city was favorable for commerce between central Europe and the East. Protected from attack by land, Venice rose in power, and with power came wealth. Many beautiful houses, churches, palaces, and museums are reminders of the ancient splendor.

FIG. 389.

A gondola in Venice — the ducal palace, or palace of the Doges, is seen on the farther side.

The city is built upon more than a hundred small islands, about two and a half miles from the mainland, with which it is now connected by railway. Naturally, canals take the place of streets. There are one hundred and fifty canals, the main one, or Grand Canal, being flanked on either side by fine residences, the steps of which lead down into the water. Nearly four hundred bridges join the different islands, and there are many narrow footpaths, but since the chief thoroughfares are canals, *gondolas* (Fig. 389) take the place of wagons, carriages, and street cars. No doubt thousands of children in that city have never seen a horse.

REVIEW QUESTIONS. — (1) In what respects is Italy's position favorable? (2) What about the size of the peninsula? (3) Tell about the origin of the people. (4) Tell about the government. (5) What are the principal features of the physiography? (6) What factors equalize the temperature? (7) Tell about the

rainfall. (8) What crops are raised? (9) Of what value is irrigation? (10) What conditions especially favor it in the Po valley? (11) Name the leading agricultural products. (12) What mineral products come from Italy? (13) What other raw products? (14) What about manufacturing? (15) Write from memory a brief description of Naples and vicinity, including Vesuvius and Pompeii. (16) Give the reasons for the location of Rome. (17) What changes have occurred since the days of the Roman Empire? (18) Tell the principal facts about each of the following cities: (*a*) Palermo, (*b*) Florence, (*c*) Milan, (*d*) Turin, (*e*) Genoa, (*f*) Venice.

Suggestions. — (1) Why should Italy have been relatively much more important in former times than now? (2) What colonies has Italy in eastern Africa? Suggest reasons why Italy has so few colonies. (3) What must have been the influence upon Genoa and Venice of the discovery of the ocean route to India? Why? (4) What must have been the influence of the opening of the Suez Canal? Why? (5) Would you expect that Italy would have a large navy? Find out how her navy ranks with those of the other five Great Powers; with that of the United States. (6) Mention advantages and disadvantages of life in Venice. (7) Make a collection of the different famous pictures of the Madonna. (8) Find out about the catacombs of Rome; the roads; the aqueducts. (9) Find out about some of the ancient Romans and Roman customs. (10) Ask some lawyer to tell you what influence Roman law has had upon our own law.

Fig. Z.

The Italian coast near Amalfi, showing the houses clinging to the hillside; the road cut and built on the cliff side, and even tunneling through it; and Amalfi itself built on a small stream delta.

XI. AUSTRIA-HUNGARY

Map Questions (Fig. 375). — (1) Compare Austria-Hungary with Germany in area. (2) Compare the two countries in population. (3) Compare the two in number of large cities. In which, therefore, would you expect to find most development? (4) About what proportion of the boundary is formed by water? (5) What countries border this empire? (6) What portions are mountainous? (7) What would you say about the variety of climate? (8) What sections do not belong to the Danube basin?

Physiography and Climate. — A large proportion of the boundary line of Austria-Hungary is determined by mountain ranges. Point out these ranges. Notice that the Russian boundary extends across an open plain. This plain is Austria's share of Poland, a kingdom which once extended from the Baltic Sea to the Carpathian Mountains. Poland was conquered and divided between Austria, Prussia, and Russia, Austria receiving the smallest share and Russia the largest.

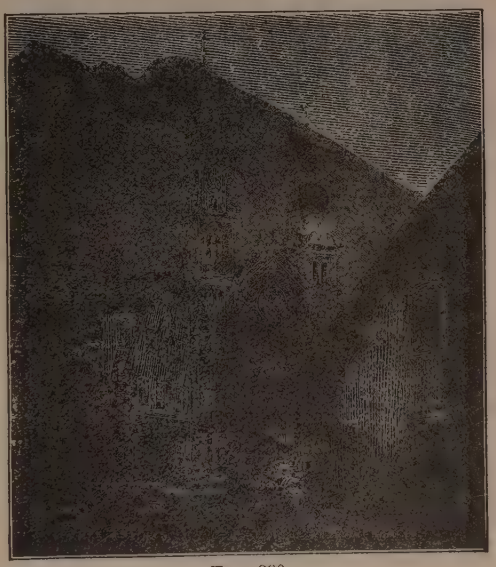


Fig. 390.

A street in a small Alpine village of western Austria.

Austria-Hungary is one of the most mountainous countries in Europe. It includes the eastern half of the Alps (Fig. 390), besides several other ranges. These mountains together form a circle inclosing a broad plain (Fig. 391), through which the Danube River flows. At two points this circle is completely broken: once near Vienna, where the Danube enters the great Hungarian plain (Fig. 375), and again on the southeastern boundary, where the river leaves the plain.

The Danube valley is the great trade route of Austria-Hungary, since it offers the best passageway through the mountains. The fact that the

river is navigable from Germany to its mouth adds greatly to the value of this route.

Transportation is all the more confined to the river route because of the peculiar coast line of Austria-Hungary. Although the country is next in size to Russia among European nations, it has only a small amount of coast. Estimate its length. There are numerous harbors, to be sure, but they are difficult of access from the interior, because of the rugged moun-

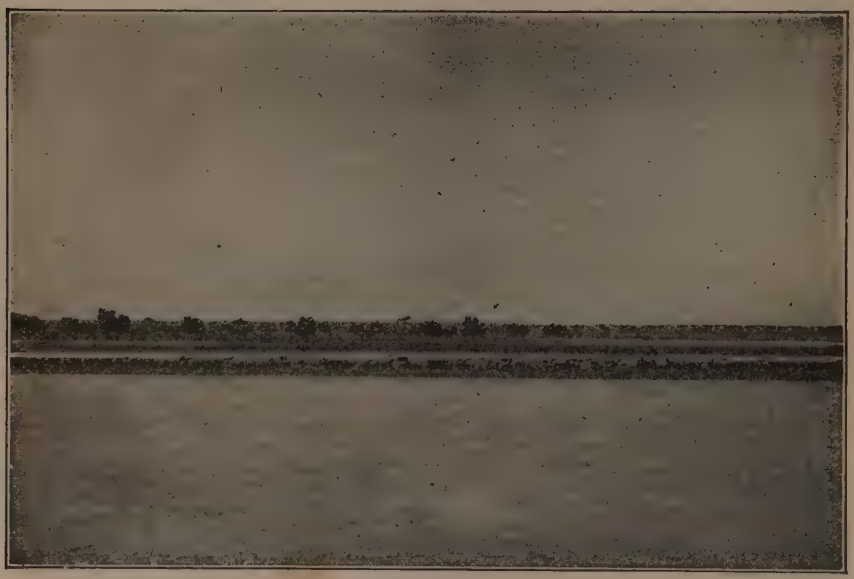


FIG. 391.

The Danube, where it flows through the Hungarian plain.

tains that rise from the very seashore. At only two points on the Adriatic can good harbors be reached from the Danube lowlands without difficulty. What cities are located at these points?

In so mountainous a country there is naturally much variation both in rainfall and temperature. Everywhere except on the higher mountains, however, the temperature is favorable for the growth of grains and other crops of temperate latitudes. That is, the summers are warm and the winters are cold; but the extremes are much greater than in England. Why? The rainfall of the lowlands, which averages little over twenty inches, is barely sufficient for agriculture, and the plains of Hungary are subject to serious drought in summer.

People and Government. — Such a rugged surface, with many inclosed valleys, separates the people and favors the development of very different customs amongst the inhabitants of different sections.

Moreover, the ease of approach from the north and east has led to repeated invasions from these directions. The result has been that the empire of Austria-Hungary is a mixture of many peoples. Germanic people, who form about a fourth of the entire population, are most numerous in Austria; while the Magyars, a race allied to the Mongolian, form nearly half the population of Hungary; but races related to the Slavs of Russia are more numerous than either of the other groups. There are, in addition, large numbers allied to the Italians and other peoples (Fig. 392). German is the official language and is spoken by the educated classes.

There are at least a dozen languages in the empire, and often two or three are spoken in a single town. To be sure, a similar statement might be made in regard to the United States, for we certainly have a great variety of languages. But no matter from what part of the earth our citizens have come, they have, in most cases, greatly modified their former customs and have become genuine Americans in spirit. The principal exception are the Chinamen, who, instead of identifying themselves with us, remain Chinamen as long as they live.

The many distinct peoples of Austria-Hungary resemble the Chinamen in their tendency to remain apart. They are not only dissimilar in religion, ambitions, and customs, but their interests are often conflicting; and they are jealous and suspicious of, and often hostile to, one another.

FIG. 392.

A Gypsy family and hut in Austria-Hungary.

It has been a difficult matter to bring these people under a common rule. Nevertheless, in 1867, the Austrian Empire and the kingdom of Hungary were united under Emperor Francis Joseph to form the empire of Austria-Hungary. Each of the countries pre-

serves its own constitution, makes its own laws, and is independent of the other in many respects, as was formerly the case in Norway and Sweden. But they work together in matters of common interest, such as the army and navy, foreign affairs, and finance.

Natural Resources. — Many of the mountain slopes are forest-covered, and in the remoter parts wild animals are still found. Since nearly one third of the empire is wooded, lumber forms one of the important resources of the country.

Where the woods have been cleared away, there are pastures for sheep and goats. Cattle are also raised, especially on the lowlands.

Near the Adriatic and in the warmer valleys there are many vineyards; and the mulberry is raised for the silkworm, as in

FIG. 393.

The Parliament building at Vienna.

Italy (p. 413) and southern France (p. 359). Flax, hemp, corn, sugar beets, and tobacco are other important crops. But the grains, especially wheat, rye, barley, and oats, are the staple agricultural products of both Austria and Hungary. The broad plains of the Danube (Fig. 391) form one of the leading wheat-producing regions of Europe. A large amount of this grain is exported, since the people, like the Germans, live much upon rye bread.

There is much mineral wealth in the mountains, including deposits of salt, gold, silver, lead, mercury, and copper. The Hungarian opal is celebrated for its beauty; and the excellent quality of the clays has made possible the manufacture of fine porcelain ware. The mineral quartz

supplies the material for the Bohemian glass blowers, who make some of the finest ware in the world.

Iron is widely distributed, and Austria-Hungary ranks third among the coal-producing countries of Europe (Fig. 305). Some of the best deposits are in the northwest, near PRAGUE, which explains why that city is extensively engaged in iron manufacturing.

Manufacturing and Commerce. — Austria-Hungary does not manufacture nearly so much as Great Britain, Germany, or France. Owing partly to the poor facilities for commerce, and partly to lack of education and common interests among the people, there has been far less development of manufacturing than might be expected.

Much of the manufacturing is still done either by hand or by very simple machines. But there has been great progress in recent years, and

FIG. 394.

Cut showing a castle in Austria, a little village at the base of the hill, and a mill at the left. Notice the thick walls, formerly of use to protect the castle from attack.

numerous cotton, woolen, flour, and paper mills, iron manufactories, and beet-sugar refineries have been set up. There is also silk weaving. The chief manufacturing region is in the northwest, next to Germany, while the principal agricultural section is in the central and eastern parts.

There is an extensive internal commerce along the rivers and the railways; but, owing to the limited coast line, ocean commerce is much less developed than in other large European nations.

The most natural trade route leads either down the Danube into the Black Sea or else westward into Germany, and thence down the Rhine valley. Why in these directions? Less than one third of the foreign shipping goes by way of Trieste. This means that the greater part of the foreign trade of the empire is carried on through foreign ports. What disadvantages do you see in that fact? Trace the chief routes.

Principal Cities. — While there are many small cities in this empire, there are surprisingly few large ones. The two largest, VIENNA, the capital of Austria, and BUDAPEST, the capital of Hungary, are on the Danube River and not on the seacoast. Suggest reasons.

VIENNA, which is larger than Philadelphia, is the greatest city in Austria-Hungary and the fourth largest in Europe. The reason for its size is found first of all in its location, on a large river in the central part of Europe. Moreover, it is situated at an opening between mountains, through which, from the earliest times, the best routes have passed from western Europe to Asia, and from northern Europe to the Mediterranean. The railways which lead from St. Petersburg to Rome, and from Berlin and Paris to Constantinople, converge toward this point, making the city a great railway and trade center.

BUDAPEST, consisting of two towns (Buda and Pest) on opposite banks of the Danube, is the seat of the Hungarian government and the home of the emperor for a part of each year. The city is in the midst of the great wheat-raising plains of the Danube, and, like Odessa on the Black Sea, is engaged in flour manufacture and grain shipment.

PRAGUE, the third city of Austria-Hungary, is situated on the navigable Elbe, which since early times has been an important trade route. Located in the midst of a rich mineral region, it is a noted manufacturing center. TRIESTE, a city about the size of St. Paul, Minnesota, is the largest Austrian seaport. Although separated from the main part of the country by mountain ranges, it is connected with the interior by a railway. Even as far back as the time of the Romans, the pass which the railway takes in crossing the mountains was followed as the route of entrance to the Danube valley. FIUME, southeast of Trieste, has an excellent harbor.

Small Countries. — On the boundary between Austria and Switzerland is *Liechtenstein*, a very small independent country united with Austria-Hungary by a customs treaty. Two other countries, *Bosnia* and *Herzegovina*, formerly parts of Turkey, are now practically a part of Austria-Hungary, and are therefore not marked separately on our maps. They include the mountainous land northwest of Montenegro and Servia.

REVIEW QUESTIONS. — (1) Tell about the physiography of Austria-Hungary. (2) Tell about the climate. (3) What is the condition of the people? (4) What about the government? (5) Name the principal raw product. (6) What is the condition of manufacturing? (7) What about the commerce? (8) Give reasons for the location of Vienna. (9) Tell about the following cities: (*a*) Budapest, (*b*) Prague, (*c*) Trieste, (*d*) Fiume. (10) What is said about small countries?

SUGGESTIONS. — (1) How must the construction of tunnels through the Alps have affected Austria-Hungary? (2) What would you say as to the relative importance of the Danube and Rhine rivers? (3) Find some Bohemian glass to see how beautiful it is. (4) In an atlas look up Austria-Hungary to find the portions which are called Tyrol, Moravia, Bohemia, and Transylvania. (5) Look up some facts about the history of Poland. (6) Suggest reasons for the absence of Austrian colonies. (7) Find out something about the Triple Alliance. (8) Read about the influence of Emperor Francis Joseph in holding the different parts of the empire together. (9) Find out something about Kossuth.

FIG. AA.

Swiss house near the timber line in the Alps. The abundance of wood leads to the building of wooden houses. The strong winds make it necessary to weight down the roofs with large stones. Rough-hewn boards are used in these houses. In parts of Europe where wood is scarce, as in Italy, wooden houses are very rare.

XII. THE BALKAN PENINSULA

MAP QUESTIONS (Fig. 375). — (1) What countries border Roumania? (2) Name the country south of the Danube. (3) What does the map tell you about the surface of each? (4) What may you expect about the variations in climate on this peninsula? Why? About the rainfall? Why? (5) Compare the number of large cities with the number in Germany and Italy. What inferences do you draw concerning the condition of the people? (6) Compare the area of Turkey in Europe with that of your own state.

Physiography and Climate. — This double-pointed peninsula is bounded on one side by the Adriatic and Mediterranean seas, on the other by the Ægean and Black seas. It is unlike other European peninsulas in having a very long land boundary. Trace it. Throughout almost its entire extent the surface is mountainous, which offers an explanation of the large number of separate countries on the peninsula. How? Many of the valleys are suitable to agriculture, the most extensive being the plains of the Danube in Roumania and Bulgaria.

The climate varies greatly from mountain to valley and from interior to seashore. Along the southern coast the winters are mild,

FIG. 395.

A view in Bulgaria, showing its rugged surface.

as elsewhere near the Mediterranean; but in the northeast, near Russia, hot summers are followed by cold winters, when icy winds sweep down from the Russian steppes, and the Danube freezes over.

In so mountainous a land there is also much variation in rainfall. On the western slopes, for example, near the shores of the Adriatic, there is an abundance of rain; but on the east coast and in the interior valleys, especially in Greece, there is so little rain that agriculture depends upon irrigation. Why is this true of Greece particularly? (p. 321.)

FIG. 396.

A Roumanian peasant.

People. — The eastern point of the Balkan Peninsula comes so close to Asia that it has been called a "bridge" between Europe and Asia. At each of two points, the Dardanelles and the Bosporus, the continents are separated only by a narrow strait. This region has also been a bridge for the passage of many peoples. Romans, various tribes of Slavs, and finally the Mohammedan Turks from Asia, have brought the peninsula under their dominion. Wherever the Turks went they brought ruin; and for four centuries, while the rest of Europe was advancing, they held this region in subjection.

Aside from Roumania, five nations now occupy the Balkan Peninsula: Montenegro, Servia, Bulgaria, the Ottoman Empire or Turkey, and Greece; and two others, Bosnia and Herzegovina, are under control of Austria-Hungary (p. 426).

Montenegro. — This tiny principality, which is smaller than the state of Connecticut, has maintained its independence largely because of its situation among the mountains. The country is of slight importance; its soil is so poor that there is little agriculture; there is less manufacturing, and not a single railway. The principal occupation is cattle raising.

Servia. — Bordering on southern Hungary, Servia shares some of the advantages of that country, including navigation of the Danube. Since much of its surface is rugged and heavily forested, only a small portion is cultivated. Among the leading products are corn, wheat, and other grains, reminding us of Hungary. There is also much fruit raising, particularly that of grapes and plums, which, when dried, are sold as raisins and prunes. Many cattle, sheep, and

pigs are raised for export, the pigs being allowed to roam in the oak and beech forests. Why there?

The resources of Servia are only partially developed. For example, although coal, iron, lead, silver, and other metals are known to exist, there is very little mining and not much manufacturing. It will require more time to recover from the centuries of Turkish misrule.

The capital of the kingdom is BELGRADE, a city finely situated upon the Danube.

Roumania and Bulgaria. — These two countries have much in common. Although the Danube separates them for a long distance, they together control its lower course. This is a fact of much importance to Austria-Hungary. Why? Broad plains suited to agriculture border the Danube in both countries, though the plains are far more extensive in Roumania than in Bulgaria. Naturally, therefore, there is much farming. While each of these kingdoms has been freed from Turkish rule, Bulgaria is still tributary to that country; that is, although in most respects independent and self-governing, it is obliged to pay an annual tribute in money to Turkey.

FIG. 397.

A Turkish lady in Constantinople, in street dress.

In both countries wheat and other grains are grown. But the warmer climate of that part of Bulgaria south of the Balkan Mountains permits the culture of products that cannot be raised extensively in Roumania; for example, the mulberry for silk, and roses for the valuable perfume, attar of roses. Many sheep as well as other live stock are raised in each country; in fact, herding is almost the sole industry on the barren steppes of eastern Roumania. There are large tracts of forest in each, but there is more in Bulgaria, owing to its rugged surface, than in Roumania. Each country has valuable mineral deposits; but, as in Servia, there is little mining. Why? Nor is there much manufacturing, except such hand work as the manufacture of Turkish rugs.

With so slight development of the resources, there are few large cities. By far the largest is BUCHAREST, the capital of Roumania. Find the capital of Bulgaria.

Turkey in Europe. — The Turks, who are Mohammedans, are controlled by ideas very unlike those of other Europeans. They are unprogressive and inclined to grant no rights to Christians, many of whom still live in Turkey. Their ruler or *Sultan* has absolute power, which he exercises with little conscience, and the government is the worst in Europe.

Not only are the mass of Turks in ignorance and poverty, but they are not encouraged to develop the resources of their land. There are valuable mineral deposits, practically unworked; the great forest tracts have been nearly destroyed; and broad areas of farm land are cultivated by the use of oxen and tame buffaloes, and by the crude methods of early centuries. Among the principal crops are wheat, corn, flax, hemp, and tobacco. Figs, and grapes for raisins, are also raised. Cattle and sheep are numerous.

FIG. 398.

Map showing the location of Constantinople.

As in other slightly developed states, there is little production beyond raw materials; and while other nations in Europe have rapidly developed in manufacturing, Turkey produces chiefly hand-made goods. Among the latter are the famous Turkish rugs, and some very beautiful articles in leather and metal, showing that the Turks have much artistic skill. With so little industry there is naturally almost no means of transportation; in fact, the roads are everywhere bad, and railways are almost lacking.

CONSTANTINOPLE, the capital of the Ottoman Empire, has been famous for many centuries. Being situated on the Bosporus, where the beautiful, river-like outlet of the Black Sea passes through a valley in the low plateau, it commands the channel through which the commerce of the Black Sea must pass. This is a natural site for a city; for in addition to its location on this water route, it is the point where the crossing can best be made from Europe to Asia. The presence of a harbor on the European side — a small bay at the

river mouth called the "Golden Horn" — and the fact that the founders were Europeans trading in Asia, rather than Asiatics trading in Europe, are reasons why a large city has grown on the European and not on the Asiatic side.

Greece. — The southern end of the Balkan peninsula is occupied by Greece. Owing to the many short mountain ranges extending in different directions, the coast line is irregular, with numerous peninsulas, islands, deep bays, and fine harbors, formed by the sinking of the irregular land. The influence of the Mediterranean causes a warm, pleasant climate, as in southern Italy; and the rainfall, which is moderate in winter, is so light in summer that irrigation is necessary for agriculture. The surface is so rough and rocky that large sections are unfit for farming.

It was in this small peninsula, under what to our eyes appear to be very unfavorable conditions, that the marvelous civilization of ancient *Hellas*, or Greece, was developed. But these conditions really had the tendency to develop strong intellectual powers and brave men. The sea and mountains protected the races from invasion, and the many fine harbors and inlets permitted constant

FIG. 399.

St. Sophia, a beautiful church in Constantinople, now used as a Mohammedan mosque.

intercourse by water. By the commerce which thus arose the Greeks became so acquainted with the sea that they were almost as much at home upon it as upon the land.

In all parts of the world it has been under such conditions as these that strong races have been developed. It was true in Scandinavia, in the British Isles, and in the Spanish and Italian peninsulas. It is also true in the Japanese Islands, the home of the most highly developed Asiatics.

Because of their ability to navigate the inland seas, the European Greeks, in very early times, carried on constant communication with the people from whom they had separated, and who still dwelt opposite them, on the coast of Asia. The arts and customs of their mother country they improved upon, and in time became the greatest power in the then known world. They developed an art and a civilization which, with all our advancement, we have not been able to excel. They also became explorers, and cruised about the entire shores of the Mediterranean at a time when most of Europe was occupied by savages or barbarians. They entered into trade relations with their neighbors, taught them Greek arts, and established many colonies. Greek arts and literature, we should note, decayed with the loss of freedom in the Greek cities, which were conquered by barbarians from the north.

FIG. 400.

A Greek peasant costume.

Through colonies in the Italian peninsula, and also through the immigration of individual Greeks, this people exerted a strong influence upon the Romans. Rome finally conquered Greece, although much of Roman civilization, and therefore the civilization of Europe, was due to Greek thought. After the decline of the Roman Empire other northern peoples devastated Greece, and finally the Turks entered and carried ruin to this as to other parts of the Balkan Peninsula. Greece is now independent and is a limited monarchy.

In this little country there are few natural resources. The principal occupations are herding and agriculture. Large numbers of sheep and goats are raised; and the chief farm products are grain, tobacco, olives, and fruits. Raisin grapes are cultivated in large quantities on the steep hillsides.

The neighborhood of the sea has led the Greeks to continue their seafaring life. Many are also engaged in fisheries, and in securing bath sponges from the shallow sea bottom among the Greek islands.

ATHENS, the capital and most important city, with about one hundred thousand inhabitants, is situated inland six miles from its port, PIRÆUS. The principal streets of the present city are quite modern, but ruins of the ancient Athens are still numerous. The most noted buildings, and some of the finest temples of ancient

FIG. 401.

A view of the Acropolis at Athens. The city lies back of the hill.

Greece, stood upon the Acropolis (Fig. 401), a level-topped rocky hill with precipitous sides. This remarkable stronghold was the natural center for settlements in the surrounding plain.

Islands near Greece. — The many islands in the neighborhood of Greece are either mountain crests or else volcanic cones. Occasionally we hear of an earthquake shock in this island region or *archipelago*, showing that the mountains are still growing. The largest island near Greece, and the last to be separated from Turkey (1898), is *Crete* (Fig. 353), which, like the smaller islands, is under the control of the Grecian government and inhabited mainly by Greeks. The inhabitants are engaged in industries that are the same as in Greece itself.

REVIEW QUESTIONS. — (1) Describe the physiography of the Balkan peninsula. (2) Tell about the climate. (3) State some of the main facts in its history. (4) Name the countries of the peninsula. (5) What can you say about Montenegro? (6) Tell about Servia. (7) In what respects do Bulgaria and Roumania resemble each other? (8) Mention some differences. (9) Locate the capitals. (10) Tell about Turkey in Europe: character of the people; government; resources; manufacturing. (11) What special reasons are there for a large city at Constantinople? (12) Describe Greece: its physiography; climate; reasons for former

importance; influence; reasons for decline; present condition; resources. (13) Tell about Athens. (14) What can you tell about the islands near Greece?

SUGGESTIONS. — (1) What reasons can you suggest for the fact that these eastern countries are in a constant state of unrest? (2) The Turkish Empire is occasionally referred to as the "sick man of the East." Why? (3) How was Greece well situated for the trade of the ancient world? (4) Learn some facts about Homer, Plato, and other noted Greeks. (5) Read some of the ancient Greek myths.

REVIEW OF EUROPE AND COMPARISON WITH NORTH AMERICA

For area, population, etc., see Appendix

(1) Compare the climate of western Europe with that of the west coast of North America (p. 321). (2) Make the same comparison for the east coast of North America. (3) What European countries were covered either wholly or partly by an ice sheet in the Glacial Period? (Fig. 306.) (4) Is the coast line of Europe more or less irregular than that of North America? Which continent has the advantage in this respect? How is it an advantage? (5) Name and locate the principal mountain ranges in each continent. Which continent has the advantage as to the direction of the ranges? Why? (p. 323.) (6) Name and locate the principal rivers in each continent. Which are the largest? (7) Draw an outline map of Europe, inserting the boundaries and names of the countries. (8) How do our larger Western states compare in area with France and Germany? In population? (9) Which are the two or three most progressive countries? Give reasons. (10) What is the prevailing kind of government in Europe? In North America? How do you account for the difference? (11) Which European country has, perhaps, the best location for world commerce? Why? (12) Which is best situated for continental commerce? Why? (p. 390.) (13) Which country of North America has the most favorable position for trade? How? (14) Compare the five largest European cities with the five largest in North America. (15) State the main advantages of the position of each. (16) Name and locate the five largest seaports of Europe (Fig. 353). (17) How do they compare in population with New York, Philadelphia, Boston, Baltimore, and San Francisco? (18) Name and locate the five largest interior cities and compare their population with that of Chicago, St. Louis, Cleveland, Buffalo, and Cincinnati. (19) What cities of Europe and North America are near the 46th parallel of latitude? The 50th? The 60th? (20) Name some agricultural products common to both Europe and the United States. (21) Name others that are found in the United States but not in Europe. Why this difference? (22) In what countries of Europe is silk produced? Do we raise silkworms in the United States? (23) In what countries are sugar beets produced extensively? (24) In what countries is most lumber obtained? (25) Make a list of the European countries which have extensive coal deposits. (26) Which countries have little or none? What is the effect on the industries in each case? (27) Which countries have little or no mining? (28) Which countries have important manufacturing industries? Which have very little? Give the reasons for this difference. (29) With which group would the United States be classed with regard to mining and manufacturing? (30) Which of the European nationalities have you seen represented on our streets? (31) Write a paper stating some of the advantages that we enjoy over European countries. (32) State some of the advantages that they enjoy over us. (33) Which one of the European countries would you prefer to visit? Why?

For REFERENCES, see *Teacher's Book*.

ARCTIC OCEAN
Bering Strait
Bering Sea
Okhotsk Sea
Japan Sea
PACIFIC OCEAN
JAPAN
ARCTIC CIRCLE
URAL MTS
SIBERIA
Lake Baikal
Black Sea
Caspian Sea
Mediterranean Sea
ISTHMUS OF SUEZ
Red Sea
ARABIA
Gulf of Aden
Arabian Sea
Persian Gulf
Tibet
Thian Shan Mts
Kuenlun Mts
PLATEAU OF TIBET
HIMALAYA MTS
Ganges R.
PLATEAU OF THE DEKKAN
Bay of Bengal
China Sea
PLAINS OF CHINA
Yellow Sea
TROPIC OF CANCER
FORMOSA
PHILIPPINE ISLANDS
EQUATOR
CELEBES
BORNEO
MALAY PENINSULA
SUMATRA
CEYLON
INDIAN OCEAN
RELIEF MAP OF ASIA

Fig. 402.

ASIA
Scale of Miles
0 500 1000
Capitals of Countries ◎
Other Places ●
Comparative Area
PENN.
45,215 Square Miles
ARCTIC OCEAN
EUROPEAN RUSSIA
SIBERIA
CENTRAL ASIA
CHINESE EMPIRE
TURKISH EMPIRE
PERSIA
ARABIA
INDIA
HINDUSTAN
CHINA
MONGOLIA
MANCHURIA
JAPAN
PACIFIC OCEAN
INDIAN OCEAN
Bay of Bengal
Arabian Sea
China Sea
Sea of Japan
Yellow Sea
Caspian Sea
Black Sea
Mediterranean Sea
Red Sea
Persian Gulf
Gulf of Aden
Gulf of Siam
Sea of Okhotsk
Kamchatka Sea
Aral Sea
Lake Baikal
Lake Balkash
Tundras
Steppes
Desert of Gobi
Desert of Kirghiz
Himalaya Mts.
Hindu Kush Mts.
Kuenlun Mts.
Ural Mts.
Altai Mts.
Yablonoi Mts.
Stanovoi Mts.
Amur R.
Lena R.
Yenisei R.
Obi R.
Irtish R.
Volga R.
Euphrates R.
Tigris R.
Nile R.
Ganges R.
Indus R.
Hoang-ho R.
Yangtse-Kiang
Mekong R.
Irrawaddy R.
Menam R.
Tropic of Cancer
Equator
St. Petersburg
Moscow
Vienna
Paris
London
Berlin
Constantinople
Cairo
Alexandria
Tobolsk
Irkutsk
Yakutsk
Peking
Tientsin
Shanghai
Hankau
Canton
Hongkong
Calcutta
Bombay
Madras
Hyderabad
Delhi
Lahore
Kabul
Bokhara
Tashkend
Khiva
Teheran
Mecca
Aden
Muscat
Colombo
Singapore
Manila
Saigon
Bangkok
Hanoi
Yokohama
Nagoya
Osaka
Kioto
Vladivostok
Port Arthur
Mukden
Harbin
Nanking
Hangchau
Changsha
Chungking
Chengtu
Yarkand
Kuldja
Lassa
Darjeeling
Calcutta
Mandalay
Sumatra
Borneo
Celebes
Philippine Islands
Luzon
Mindanao
Formosa
Hainan
Ceylon
Cape Comorin
C. Guardafui
C. Cambodia
Straits Settlements
Str. of Malacca
Str. of Bab-el-Mandeb
Str. of Hormuz
Suez Canal
Black Sea
Caucasus Mts.
Elburz Mts.
Zagros Mts.
Sea of Azof
Lake Aralsk
Lake Tengri
Lake Yamdok
Lake Kuku-nor
Lake Hanka
Lake Baikal
Lake Yablonoi
Lake Kaidalov
Lake Tali
Lake Tsing-hai
Lake Dyang-tsi-kiang
Lake Tung-ting
Lake Poyang
Lake Tai
Lake Chaka
Lake Urumiah
Lake Van
Lake Tiberias
Lake Dead Sea
Lake Tonle Sap
Lake Toba
Lake Singkarak
Lake Manindjau
Lake Ranau
Lake Laut Tawar
Lake Sarasvati
Lake Rakas
Lake Manasarowar
Lake Palembang
Lake Kerinchi
Lake Indragiri
Lake Siak
Lake Kampar
Lake Rokan
Lake Bandung
Lake Pekalongan
Lake Semarang
Lake Rembang
Lake Surabaya
Lake Pasuruan
Lake Probolinggo
Lake Besuki
Lake Bondowoso
Lake Situbondo
Lake Banyuwangi
Lake Jember
Lake Lumajang
Lake Malang
Lake Kediri
Lake Blitar
Lake Tulungagung
Lake Trenggalek
Lake Ponorogo
Lake Madiun
Lake Magetan
Lake Ngawi
Lake Bojonegoro
Lake Tuban
Lake Lamongan
Lake Gresik
Lake Sidoarjo
Lake Mojokerto
Lake Jombang
Lake Nganjuk

FIG. 404. Some of the animals of Asia.

Fig. 405.

The volcano of Fujiyama in Japan.

Fig. 406.

The gorge of the Yangtse-kiang in China.

FIG. 407.

Native humped cattle used as draught animals in Burma.

FIG. 408.

Spinning as done in Palestine and other parts of Turkey.

Part V

ASIA, AFRICA, AUSTRALIA, AND ISLAND GROUPS

I. ASIA

Size and Position. — Asia, the largest of the continents, includes almost one third of the land of the globe. Its immense size is shown by the fact that it reaches from near the equator to a point halfway between the Arctic Circle and the North Pole. How many degrees is that? How many miles? It is six thousand miles from the Mediterranean Sea to Bering Straits; and so many degrees of longitude are included in Asia that, according to our plan for standard time, one would need to change his watch ten different times in going from one extreme to the other. How many changes are necessary in crossing the United States? (Fig. 38.)

This great land mass, which reaches to within fifty miles of North America, is united to Africa by the Isthmus of Suez, while for a long distance the two continents are separated only by the narrow Red Sea. What is its connection with Europe? Why are the two often called Eurasia? (p. 317.) In what zones does Asia lie? Is the same true of any other continent?

Physiography and Climate (Fig. 402). — Asia resembles Europe in the irregularity of its mountains. While many of them extend east and west, there are others running nearly north and south. Name some of each. The islands and peninsulas are due to uplift of the earth's crust, while the seas which they inclose occupy depressions between the uplifted parts. Since the mountain growth has not ceased, many of the islands are still slowly rising or sinking; and as the rocks move and break, earthquake shocks are common, some

of them being terribly destructive. There are also many volcanoes (Fig. 405); in fact, the islands off eastern and southeastern Asia form the most active volcanic and earthquake region in the world.

Although northern and western Asia is a vast plain, so much of the continent is mountainous that more than one twelfth of the surface has an elevation above 10,000 feet. Here are found the Himalayas (meaning abode of snow), of which the loftiest peak, Mt. Everest (29,000 feet), is the highest in the world. Locate it. And here, too, are ranges with peaks

FIG. 409.

A tropical scene in a village in Ceylon.

rising above valleys which are themselves 11,000 feet above the sea, or higher than most mountains. Between the mountains are tablelands, like that of Tibet, the elevation of which is from 10,000 to 15,000 feet, or in places as high as the loftiest peaks of the Alps.

Much of central Asia is so arid that some of the rivers from the mountains end in the desert sands, which are often heaped by the wind into low hills or dunes. But from the margin of the great central highland large rivers flow north, south, and east to the sea. On an outline map of Asia draw heavy lines to show the chief mountain chains, and then add the large rivers with their names. Fed by the rains, snows, and melting glaciers of the mountains, these streams have a great volume of water and bear immense quantities of sediment, which they spread out over their broad flood plains or build into deltas in the sea. In the east and south these fertile, river-made plains are valuable for agriculture, and are the seats of the densest populations in the whole world.

Many of the rivers are deep and navigable (Fig. 406); yet some of the largest lose much of their value for transportation because they flow north-

ward over the cold plains of Siberia. This reminds us of the rivers of northern Canada, which also flow into the Arctic, and are therefore frozen during a large part of the year.

In so vast a land, with such differences in elevation, there are, naturally, many different climates. Tropical heat is found in southern Asia, with dense forests in the belt of calms (Fig. 409) and in those places where ocean winds blow over the land; but where winds from the ocean cannot come, there are broad deserts. Upon the mountain slopes and in the more northern latitudes, the climate is either temperate or frigid, as in North America and Europe.

For example, the climate about Peking resembles that of northeastern United States; and the plains of central Siberia resemble in climate the plains of Minnesota and Dakota, and produce the same crops. Such a climate, with warm summers and very cold winters, is called *continental;* and since Asia is the largest continent, the continental climate is best developed there. Thus where the Arctic Circle crosses the Lena River, the average temperature is 60° in July and 60° below zero in January, a range of 120° between summer and winter. This is the lowest winter temperature known in the world, and this point is therefore called the *cold pole* of the earth.

FIG. 410.

The banyan, or Indian fig tree, from whose lower branches shoots descend and take root — common in Ceylon and other parts of southern Asia.

Plants and Animals. — The cold northern part of Siberia, like northern Europe and America, is a vast expanse of frozen ground, called tundra. Toward the south the tundra grades into the forest, low, stunted trees being followed by true forests of evergreens, birches, poplars, etc. Farther south, where the rainfall is light and the evaporation rapid because of the higher temperature, the soil is so dry in summer that the forests disappear. These steppes are covered with luxuriant grass in the north, but farther south they grade into the desert. Since northern Asia is really a continuation of Europe, the wild plants and animals, as well as the farm products, resemble those of Europe.

In southern Asia, on the other hand, from Arabia to China, the

plants and animals resemble those of Africa rather than those of Europe and northern Asia. One reason for this is that southern Asia has a tropical climate like Africa; another is that a mountain and desert barrier separates northern from southern Asia. Trace this barrier on Figure 402. As in Africa, the arid portion, including Arabia, Persia, and central Asia, is the home of the camel (Fig. 404) and ostrich (Fig. 442), while the elephant and rhinoceros (Fig. 404) live on the savannas and in the tropical jungles. Southern Asia is also the home of the fierce tiger and numerous species of monkeys and apes (Fig. 404).

The extent to which the Asiatic people have employed animals in their service is indicated by the following facts. On the frozen tundras, where none of the other large domesticated animals thrive, the reindeer not only supplies milk, meat, and hides, but is also used as a work animal. The camel, whose original home seems to have been Asia, makes human habitation possible in the desert (Figs. 404 and 419). Elephants are domesticated and made to work in the dense tropical forest (Figs. 411 and 427); and the buffalo is used as a work animal in hot, damp lands where horses find the climate trying (Fig. 441). Among the lofty plateaus and mountains, where the air is so rarefied and the slopes so steep that other work animals cannot be used, the yak is domesticated. Upon the steppes, where herds of cattle, sheep, and goats are kept, the horse is so necessary to the herder that the men almost live in the saddle. Indeed, the word *Cossack*, applied to Russians who dwell on the steppes, means horseman.

FIG. 411.

An elephant in Ceylon drawing a cart loaded with cocoanuts.

People. — Early progress toward civilization was made possible in Asia largely because certain portions were so favorably situated. The flood plains of the Euphrates and of the Indian and Chinese rivers had a fertile soil and an abundance of water for irrigation. They were, moreover, protected from invasion by ocean, desert, and mountain barriers, and the inhabitants could therefore cultivate the arts of peace. Among the shut-in valleys of the lofty mountains, also, were centers where development was possible because so protected from wandering hordes.

Asiatic peoples, moving into Europe, carried the civilization of their old home with them, and in time advanced much beyond those whom they left behind. In fact, while Europeans have been progressing, the Asiatics have been standing still, or even falling back.

FIG. 412.

Japanese rain coats.

One reason for this last fact is the very isolation which made the first development possible; for the people were so cut off and separated geographically that they failed to learn from others, as those Europeans who dwelt along the Mediterranean were able to do. A second reason is that many Asiatics, like, for example, the Chinese, have felt that their civilization was the best, and have therefore refused to learn. A third reason is found in the wonderful development of navigation by Europeans.

More than half of the human race live in Asia, two thirds of them belonging to the yellow division (p. 277), while the remainder are mainly whites. But although there are more than eight hundred million human beings there, most of the continent is sparsely settled. The mountain slopes, the cold plateaus, the steppes, deserts, forests, and tundras support but few inhabitants. Nearly seven eighths of the people dwell near the coast, especially on the river flood plains and deltas of the south and east.

There almost every foot of available land is cultivated, and soil is even transferred to boats on the rivers.

Turkish or Ottoman Empire. — While Constantinople, the capital of the Turkish Empire, is in Europe, Turkey has ten times as much land in Asia as in Europe.

Conditions in the Empire. — Turkey in Asia, although of little importance among nations at the present time, is of peculiar interest to us because of its historical associations. It is within its territory that many of the places mentioned in the Bible are located (Fig. 416); here also Christ was born, as well as the prophet Mohammed; and it was from this center that much of the ancient civilization spread along the shores of the Mediterranean.

Much of Turkey in Asia is table-land, with short mountain ranges and extinct volcanoes, of which Mt. Ararat is an example. Except along the coast of the Mediterranean and Black seas, where the wind brings vapor, there is little rainfall. The streams are usually short and shallow, and there are numerous salt lakes. Point out the two principal rivers (Fig. 403).

Some of the mountain slopes are forested, but elsewhere the country is open, and in places suited to herding and agriculture. In the valleys, wheat, grapes, olives, figs, oranges, and cotton are raised, usually by the aid of irrigation. SMYRNA is the most important seaport. Locate it. Find TREBIZOND.

The inhabitants, though so near Europe, have not advanced as Europeans have. The valuable minerals are scarcely worked at all; herding and farming are carried on in much the same way as in the time of Christ; and there is practically no manufacturing except that done by hand (Fig. 408). Some of this work, however, is very beautiful, as, for example, the Turkish rugs already mentioned (p. 431).

The unfortunate history of the region furnishes an explanation of its lack of development. Asia Minor, the peninsula between the Mediterranean and Black seas, was the pathway for the ancient caravan trade between Europe and Asia. While this brought prosperity, it also led to many invasions. More than five centuries before Christ the country was conquered by the Persians; two centuries later it came under the control of the Greeks; and later still it became a part of the Roman Empire. After that, with the decline of the Roman Empire, came invasions by wandering Turks, Tartars, and others. It was by this route that the Mohammedan Turks gained a foothold in southwestern Europe, and by their occupation devastated the country. Notwithstanding Mohammedan persecution, many of the inhabitants still profess the Christian religion,

HOLY LAND.
Scale of Miles
0 5 10 15 20 25
Railroads
Highways
Dry River Bed
Part of Jordan Valley below Sea Level, shown in purple.
34° 30′
35°
35° 30′
33°
32° 30′
32°
31° 30′
31°
Kedesh
Waters of Merom
Achzib
UPPER
GALILEE
GAULANITIS
Bethsaida Julias
Chorazin
Ptolemais (Accho)
Capernaum
Magdala
Sea of Galilee
City of Gergesenes
Tiberias
Hippos
R. Damascus
R. Kishon
Mt. Carmel
Cana
Nazareth
LOWER
Mt. Tabor
Nain
Dor
Plain of
GALILEE
Esdraelon
Bethabata
Arbela
Cæsarea
Scythopolis (Beth-Shean)
Pella
DECAPOLIS
Salim
Enon
Dion
SAMARIA
Samaria
Enon
Mt. Ebal
Shechem
Sychar
Jacob's Well
Gerasa
Jabbok
Jordan
Plain of Sharon
Mt. Gerizim
Antipatris
Joppa
Shiloh
Mt. Gilead
Ramoth Gilead
Mts. of Ephraim
Lydda
Bethel
Rabbath Ammon (Philadelphia)
Jabneh (Jamnia)
Emmaus
Jericho
Rama
AMMONITIS
Azotus
JERUSALEM
Mt. of Olives
Bethphage
Bethany
Mt. Nebo
Askalon
Bethlehem
JUDÆA
Machærus
Hebron
Gaza
Plain of
Mts. of
Judæa
R. Arnon
Wadi
IDUMEA
Beer-sheba
Ghuzzeh
DEAD SEA
MOABITIS
DAROMA
Wilderness of Judæa
L.L. POATES ENGR'G CO., N.Y.
34° 30′
Longitude 35° East from
35° 30′
Greenwich

FIG. 416

Fig. 413.
The river Jordan

Fig. 414.
Tiberias on the Sea of Galilee

although at great cost, as is proved by the frequent massacres of the Armenians.

There are two parts of Turkey in Asia that merit special mention; namely, the *Holy Land*, and the valley of the Euphrates and Tigris rivers, or *Mesopotamia*.

The Holy Land (Fig. 416). — This part of Turkey in Asia possesses peculiar interest for us. Back of a straight coast, with no good harbors, lies a narrow coastal plain, beyond which are two low mountain ranges including between them the remarkable depression in which the Dead Sea is situated. While Hebron (Fig. 416) is about three thousand feet above sea level, the surface of the Dead Sea, a few miles to the east, is almost thirteen hundred feet below sea level, being the deepest depression on the lands of the world. Although fed by the river Jordan (Fig. 413), which flows out of a fresh-water lake, the Sea of Galilee (Fig. 414), the water of the Dead Sea is so dense from the salt it contains that a person cannot sink in it. The Jordan Valley lies no farther south than southern Alabama; yet since it is so low and inclosed, its climate is almost tropical.

Before the coming of the Jews this region was divided into small countries, often under the rule of their more advanced and powerful neighbors, the Egyptians. Then the Jews entered this "promised land" and created a kingdom which attained its greatest power under Solomon. It was here that many of the events in the Old Testament occurred, including the advance in religion from the belief in many gods to the acceptance of one all-powerful God. Persians, Egyptians, and Romans later ruled over Palestine, and it was during the control of the latter people that Christ was born at Bethlehem. What events in the life of Christ can you mention that occurred at some of the places marked on the map? (Fig. 416.)

FIG. 415.

A part of Bethlehem.

At the time of the birth of Christ, as we learn from the Bible, the region was highly developed. Wheat was raised upon the uplands, and olives, figs, and grapes in the valleys, while herds of sheep roamed over

the plateaus and mountains. Palestine lay on the great caravan route which, leading from Egypt to the distant East, ran northward as far as DAMASCUS (Fig. 403) in order to avoid the Syrian desert. Throngs of people, therefore, passed this way. JERUSALEM (Fig. 417), the capital, was a great city, situated upon a lofty elevation that made it an important stronghold.

The city is now visited by many Christians, and also by Mohammedan pilgrims who believe that Mohammed ascended to heaven there. Very little of importance is to be seen, for much of the country, once "flowing with milk and honey," is in ruins. Even the usual mode of travel is by

FIG. 417.

A view in Jerusalem.

mule or camel, as in olden times, although a short railway climbs the mountains from the seacoast at JOPPA to JERUSALEM, and another has been begun, following the old caravan route through NAZARETH, past the Sea of Galilee, to DAMASCUS. Trace these two lines. According to the scale (Fig. 416), what is the length of Palestine? The breadth?

Mesopotamia. — This region, including the fertile valleys of the Tigris and Euphrates rivers, has suffered the same fate as the rest of Turkey in Asia. Formerly a country of great resources, crossed by a network of irrigation canals, "a garden of the Lord," it has been devastated by the Arabs and Turks until it is now almost a waste. Babylon and Nineveh, once the seats of a wonderful civilization, are now marked only by mounds of ruins. From these ruins records are at present being unearthed which promise to throw much light upon ancient history.

Under such condition there can be little commerce, though the Tigris is navigable with steamboats as far up as BAGDAD. This city, situated on the caravan route to the east, was of much importance in ancient times. There is still some trade between Europe and India along this route.

Arabia. — This peninsula is a plateau several thousand feet in elevation, with a fringe of mountains (Fig. 418), most prominent in the south and west. What waters border Arabia? Since the coast line is wonderfully regular, there are few harbors and therefore few coastal cities. Nevertheless, the inclosed seas favored the early development of navigation here as in the Mediterranean. Therefore in very early times Arabian ships carried on commerce with Africa, India, and even with eastern Asia.

The climate is hot along the coast, but cool on the plateau and among the mountains. A great part of the interior is desert, and almost everywhere the rainfall is light. Why? (p. 253.) What about large rivers? Coffee is raised in the southwest, near Mocha; the date palm flourishes in many places; and fruits and vegetables are produced in many of the valleys.

In so unfavorable a climate the population is necessarily sparse and largely nomadic. Cattle, sheep, goats, horses, donkeys, and dromedaries are raised in large numbers.

FIG. 418.

A view among the Arabian mountains.

Mecca, a Turkish city about fifty miles from the sea, is sacred to all Mohammedans. It was here that Mohammed was born, and every Mohammedan is supposed to make a pilgrimage to it at least once during his lifetime. Most of these pilgrims come by sea, and every year the city, as well as the roads leading to it, are crowded with them.

Persia. — Like Arabia, Persia is an elevated tableland with large tracts of desert and salt steppes of little or no use to man. The arid climate prevents the formation of large rivers; but the rains

Fig. 419.

A drove of camels in Persia.

and snows of the parallel mountain ranges permit some irrigation in the broad valleys. There is so little rainfall, however, and evaporation is so rapid during the hot, dry summer, that water for irrigation is often led from the mountains in underground tunnels. Why are tunnels preferable to ditches?

The main farm products are tobacco, wheat, barley, cotton, and opium. Much silk is also produced, and roses are cultivated for the manufacture of attar of roses. The principal agricultural portion is near the Caspian Sea, where there is sufficient rainfall for crops and also for extensive forests on the mountain slopes. Among the mineral deposits is the precious stone turquoise; but although there are doubtless other valuable minerals, there is little mining. Along the coast of both Arabia and Persia precious pearls and pearl shells are found.

Nearly two million Persians belong to nomadic tribes (Figs. 419 and 420) which roam about the desert, dwelling in tents, and herding goats, sheep, and other animals. There is no extensive manufacturing, but the

Persians, like the Turks, do some very beautiful hand weavin
example, shawls and rugs. Their carving and inlaid metal ar
work are also wonderfully artistic.

The government of Persia resembles that of Turkey, a
therefore very bad. The ruler, or Shah, an absolute monarch, cont
the lives and property of his subjects, who are mostly Mohammedans. TEHERAN, the capital, has some beautiful mosques, though the dwelling-houses are made of sun-dried bricks and face narrow, filthy streets.

FIG. 420.
A Persian nomad girl.

Afghanistan.—This country, "one of the waste places of the world," is a region of sand, bare rocks, and snow-capped mountains. Only in the valleys is the soil made to yield a harvest; and even there the cold, blustering winters and the dry, scorching summers make one of the worst of climates. Life under such unfavorable conditions has developed a people noted for hardiness, stubbornness, bravery, and cruelty.

As in other Asiatic countries so far studied, the government is very bad. The ruler, the merciless *Amir*, holds his authority by means of the terror which he inspires. His seat of government is at KABUL, nestled among lofty mountains. Since Great Britain has pushed her Indian frontier northward, while Russia has encroached on the opposite side of Afghanistan, this country is often called the "buffer state" between these two rival powers.

Russia in Asia. — This vast section of the Russian Empire includes about one eighth of the land surface of the globe. There are several divisions, such as Turkestan and the dependencies of Bokhara and Khiva; but by far the largest is Siberia, which is a million

square miles larger than Europe, and even larger than the United States, Mexico, and Central America combined. Yet it has less than one twelfth as many inhabitants as the United States alone. It is cold, bleak tundra in the north, and arid steppe in the south, while in the east are lofty plateaus and mountains. But in the central part is a broad belt of agricultural country, and much forest-covered land.

In the past Siberia has attained a reputation mainly as a source of minerals, and as a place of exile for Russians whom the government wishes to dispose of for political or other reasons. Gold has

FIG. 421.

A village in Siberia.

been found in a number of places, as in the Urals and near Lake Baikal, the largest fresh-water lake on the continent. But while there is much mineral wealth in Siberia, there has been little mining, except in the western part near Russia.

The defeat of Russia in the great war with Japan (1904–05), by turning the minds of the Russians from schemes of conquest to the promotion of the arts of peace, may prove of the greatest advantage to her great Eastern Empire.

A new era seems about to open for this vast empire, for the Russian government is now constructing extensive railways which will open up the country for development. One system extends eastward from the Caspian Sea to Turkestan (Fig. 403), while another and longer one reaches from Russia in Europe to the Pacific Ocean. Trace it on Figure 403. Hitherto transportation across the vast plans, arid steppes, and rugged eastern mountains has been difficult in the extreme.

But by the building of railways we may expect a rapid development of Siberia, whose resources are far greater than the sparseness of the population would indicate.

There are some important cities in Russia in Asia. The largest in the southwest is TASHKEND, which is about the size of Toledo, Ohio. TIFLIS, between the Black and Caspian seas, is really in Asia, though the Russian government classes this region with its European provinces. It is about the size of Tashkend. There is a number of other cities with a population of fifty to a hundred thousand. In Siberia there are no large cities, though several along the railway, including IRKUTSK and VLADIVOSTOK, are now growing rapidly.

India. — This densely populated peninsula, with its warm climate, offers a striking contrast to cold, sparsely populated, and slightly developed Siberia.

Physiography and Climate. — Lying largely in the torrid zone, the Indian peninsula has a hot climate. Its position in the trade-wind belt might lead us to expect much desert, especially on the lee or western side. But this coast really has a heavy rainfall because it is reached by the summer monsoons (Fig. 262). In the winter, however, when the winds blow from the land, the climate is so dry that plants wither; and in Baluchistan, which is not affected by the summer monsoons, there is true desert. Southern India and Ceylon, on the other hand, have a heavy rainfall at all seasons. Why?

FIG. 422.

Natives of the Cashmere valley.

India, which is in the form of a triangle, has a remarkably regular coast and therefore few good harbors. Most of the peninsula is a plateau, rarely more than two thousand feet high, and largely covered with lava flows like those of the Columbia River valley of western United States.

North of the plateau is a broad lowland occupied by the Brahmaputra, Ganges, and Indus rivers, which, like the Po of Italy, have built the plains out of sediment brought from the mountains. Among the lofty mountains which lie to the north of the river plains, the highest are the Himalayas, in which there are scores of peaks that reach an altitude of over four miles. Even the mountain passes are from seventeen to nineteen thousand feet above sea level, or much higher than Mt. Blanc in the Alps.

Farming. — This mountain system has formed a northward barrier to British conquest, as in former days it served as a barrier to invasion from nomadic hordes which overran Asia Minor. With such protection the fertile plains and deltas of the three great rivers became the seat of early civilization. From the very earliest times the people have been engaged in farming, and at present fully three fifths of the population follow that occupation.

As there are 287,000,000 inhabitants in an area of about 1,559,000 square miles, it will be seen that there is an average of 184 persons for every square mile; and in parts of the country there are 500 per square mile. The density of population may be better understood by remembering that there are only twenty persons per square mile in the United States. There are, in fact, almost as many people in India as in North America South America, and Africa together.

Millet, which grows on the drier lands, and rice, which is raised on the river lowlands where the land can be flooded, are the staple foods of the natives. After the dense population is fed, however, little is left for export. Wheat, on the other hand, is raised for export, and India is a vast granary for Great Britain. Much cotton is also produced. Some of this is manufactured into coarse fabrics for use at home and for export to China and Africa; but much is exported as raw cotton for use in the cotton mills of Great Britain. Other agricultural products are tea, sugar cane, tobacco, opium obtained from a species of poppy, indigo of value as a dye, and jute grown upon the sandy river bars for the sake of its coarse, strong fiber.

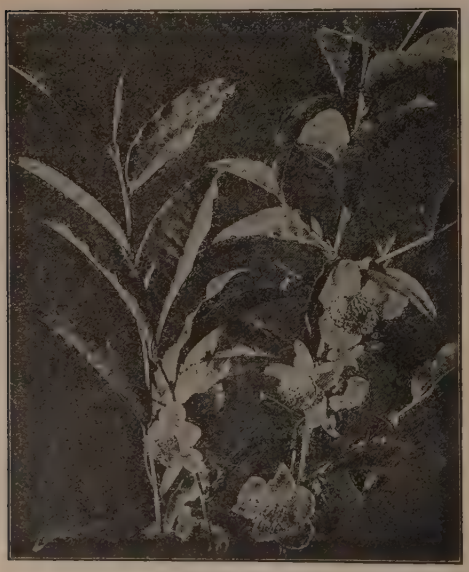


FIG. 423.
A tea plant.

For the production of rice, and for other crops as well, irrigation is necessary in many places. Therefore this country, favored with large rivers fed by the rains, snows, and melting glaciers of the mountains, has some of the **most extensive irrigation works in the world.**

Forests and Wild Animals. — There are valuable forests on the mountain slopes, where the trees, including pines, firs, and junipers, resemble those of Europe; and there are also magnolias and the beautiful deodar, a species of cedar. In the hotter portions are valuable medicinal plants and spices, such as pepper and cinnamon. The teak, with strong, durable wood, of great value in building, and the mango, the fruit of which is important as a food between harvests, are both common. Besides these,

FIG. 424.

A native village near Calcutta. Notice the bamboo on the right.

the bamboo and various palms are of great value. The bamboo is employed in hundreds of ways in making implements and building houses (Fig. 424); and the palms supply juices for drink, fiber for ropes and mats, and cocoanuts (Fig. 411) for food and oil.

In parts of the Ganges valley and elsewhere there are *jungles*, or tracts of waste land densely covered with bamboos, canes, etc., and very difficult to penetrate. From these wastes the lion has almost disappeared; but the elephant is still found, and there are various species of the monkey; also the rhinoceros, buffalo, leopard, wild boar, wolf, and Bengal tiger (Fig. 404). The tiger is much dreaded, for it not only preys upon cattle, but even attacks men. Among the Himalayas, goats, sheep, and dogs still exist in a wild state. Crocodiles live in the rivers; and venomous serpents are said to kill as many as twenty thousand persons each year.

Mining and Manufacturing. — In addition to the raw products of farms and forests there are valuable minerals, including salt, petro-

leum, coal, and iron. India has long been noted for hand-made goods of great beauty; but with the exception of these there is little manufacturing. Of late, however, there has been a marked development of cotton manufacturing by machinery.

Fig. 425.

A tomb and mosque in India.

Famines and Plagues. — Although these people are so extensively engaged in agriculture, there are times when they do not raise enough food for their own use, and then terrible famines result. These occur when rain fails; and it may be that one section suffers while another has an abundance. With the building of railways the danger of famines decreases, for then different sections are brought more closely together. The first railway was begun in 1854, and there is now a network across the peninsula (Fig. 403).

But even the railways do not entirely remove the danger; and probably famines will not cease so long as such vast numbers depend entirely upon the products of the soil.

India has also been visited by plagues which have destroyed tens of thousands of lives. With a population so dense, in a climate so hot, disease spreads with rapidity and with terrible effect, particularly among people who are not properly nourished.

The people have many religious superstitions. For example, the Ganges, doubtless because of its great value for irrigating and fertilizing the soil, is considered a sacred river (Fig. 429); and bathing in its waters is supposed to

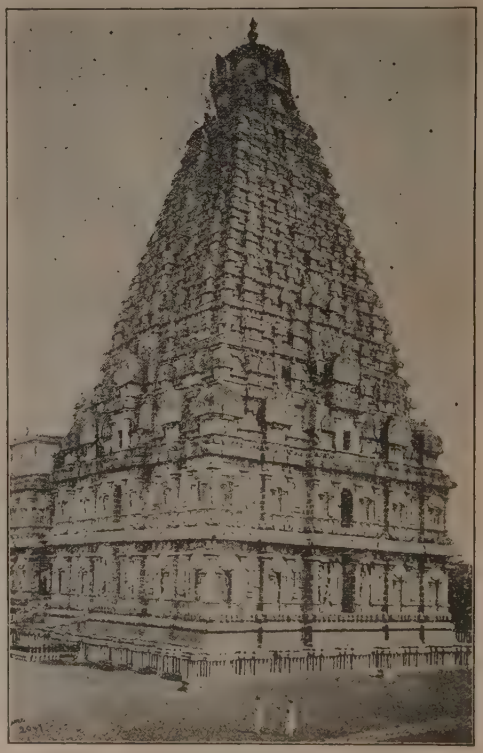


Fig. 426.

The Great Pagoda in India — a sacred temple.

wash away disease, though, since the waters are also used for drinking, this custom is no doubt responsible for the spread of much disease. The conscientious Hindu makes at least one pilgrimage to the holy river as a means of gaining divine favor and forgiveness.

Government. — Over three hundred years ago a company of London merchants obtained a foothold in India for trading purposes. The peninsula was then divided among many native rulers, and at

FIG. 427.

Elephants at work in a lumber yard in Burma.

various times the British government was called upon to settle disputes between them. Partly in this way, and partly through the occasion of intervening for the protection of British subjects engaged in the Indian trade, Great Britain gradually gained control of the peninsula. India was formally transferred to Great Britain in 1858, and in 1877 the Indian Empire was established as a part of the British Empire. The king of the British Isles is also styled Emperor of India.

By their protection and direction, the British are able to maintain their hold upon this vast country, the population of which is more than seven times that of the British Isles. Throughout India there is an average of but one British resident to every three thousand natives, and by far the greater number of government officers are Hindus. One of the

members of the British ministry is Secretary of State for India; and, as in the case of Canada, a governor-general, called the *Viceroy*, is sent from Great Britain as chief executive officer. The British have not attempted to overturn the numerous native states; nor have they interfered seriously with the firmly established customs of the people.

Baluchistan and Burma. — The Indian Empire is not confined to the Indian peninsula. It includes also the desert country of Baluchistan to the west, and fertile Burma to the east. In the latter country there are great numbers of Mongolians. Vast quantities of rice are raised, and there are other valuable products, as rubies, sapphires, and tropical woods. In Burma the elephant is used for moving logs (Fig. 427), drawing plows, and carrying passengers. RANGOON, the seaport, is noted for its export of rice; but MANDALAY, farther up the Irawadi River, is the largest city in Burma.

Base of Himalayas. — Between Burma and the peninsula of India, at the base of the Himalaya Mountains, is the region which has the heaviest rainfall in the world (p. 260). Much tea is raised on the hills of that section (Figs. 423 and 428); for tea requires a hot climate, an abundance of

FIG. 428.

Picking tea in India.

rain, and sufficient slope to prevent the water from standing about the roots of the plant.

The tea plant, which is three or four feet high, has bright green leaves resembling those of a rose bush. The leaves are picked several times a year, often by boys and girls. After they are picked they are dried in the sun and later in buildings, in order to remove all moisture before packing.

Just north of this tea district, among the Himalayas, are *Nepal* and *Bhutan*, which, though small, retain their independence because they are so protected by the mountains.

Principal Cities. — So many Hindus are engaged in farming that only about five per cent of them dwell in large towns. Nevertheless,

FIG. 429.

Temples along the Ganges at Benares.

there are seventy-five cities with a population of over fifty thousand; the two largest are Calcutta, with a population of one million, and Bombay, with a population of three quarters of a million.

CALCUTTA, the largest city, is a seaport on the Ganges delta and the natural outlet of the fertile Ganges valley; but it has a poor harbor on a river that varies in volume. It has some manufacturing, — being near coal fields, — but it is chiefly important as a commercial center and as the residence of the Viceroy.

Farther up the Ganges are the smaller cities, LUCKNOW and BENARES. The latter, the "holy city of the Hindus," is on that part of the Ganges which is deemed most holy. At this point temples (Fig. 429) line the banks of the river for miles, and a steady stream of pilgrims pours in and out of the city.

While there are several cities on the Ganges, there are none on the Indus large enough to find a place on our map. This is not because the Indus is useless for irrigation, but because of shallow waters and sand bars which interfere with navigation. These are due to the fact that the river, though well supplied with water from the mountains, loses much of it by evaporation in crossing the arid plains. Thus it is obliged to deposit some of its sediment as sand bars in its channel.

BOMBAY, next in size to Calcutta and the nearest port to England, is a great business center. It is, moreover, the only Indian city with a really good harbor. MADRAS, the third largest city, is situated at a point where there is only an open roadstead protected by a breakwater.

Ceylon. — With a fertile soil, abundant rainfall, and high though equable temperature, Ceylon is a beautiful tropical garden, and was considered by the Arabs to be the Garden of Eden. Among the products of Ceylon are cocoanuts, rice, fruit, coffee, and tea. The island is the third most important tea-producing section in the world. Other products are sapphires and rubies from the stream gravels, and beautiful pearls and mother of pearl obtained from shellfish which live among the coral reefs.

Indo-China and the Malay Peninsula. — This peninsula consists of a series of mountain chains, spreading fan-shaped southward, with numerous long, narrow valleys between, which broaden toward the south and terminate in fertile, populous delta plains at the river mouths. In addition to Burma, a part of the Indian Empire, there are three divisions of this peninsula: (1) *Siam*, (2) *French Indo-China*, and (3) the *British Straits Settlements*.

Siam. — In this tropical country most of the inhabitants, who are either Chinese or Malays, live along the rivers and irrigation canals, where they are largely engaged in the production of rice. Millet, which is raised in the drier places, competes with rice in importance as a food. Among the mineral products are rubies, sapphires, gold, and tin. The forests yield tropical woods, especially teak wood, for use at home and for export.

Siam is a monarchy, the king being assisted by a council of ministers and a legislative body of noblemen. The poorer classes are still kept in a

kind of serfdom by the local governors; that is, they may be compelled to labor for the governors for two or three months each year.

Bangkok, the capital and largest city, is situated on the banks of a muddy river, up which vessels of small draught are able to pass to the city. Most of the inhabitants live either in poor houses on narrow ill-kept streets, or else in boats and floating houses on the river; but the king has magnificent palaces decorated with carved marble and frescoed with gold. Buddhism is the religion of the country; and in Bangkok

Fig. 430.

A Buddhist temple at Bangkok.

alone there are said to be ten thousand Buddhist priests whose temples (Fig. 430), decorated with gold, silver, and jewels, are wonderfully gorgeous. Next to the king the white elephant is held in highest reverence, and Siam is often called "the Land of the White Elephant."

French Indo-China. — This dependency of France resembles Siam in climate, people, and productions. Silk, cotton, tea, and spices are other products, and there are also extensive coal beds. Some coal is exported.

Straits Settlements. — This is the name given to the British possessions on the southern end of the Malay peninsula. In that hot, damp country, so near the equator, such tropical products as rice, cocoanuts, gutta-percha, and spices are obtained. Extensive deposits of tin are found in this region, which supplies about half the tin used in the world. The mining is done

crudely by Chinese, while the native Malays are mainly engaged in farming and fishing. The only city of importance is SINGAPORE.

Chinese Empire. — *Area and Population.* — This empire, which is nearly as large as Siberia, has more inhabitants than any other nation in the world. It includes nearly half the population of Asia; that is, about the same number as are found in North America, South America, Africa, Australia, the British Isles, and Germany together. Or, otherwise expressed, it has fully twenty-five million more people than live in all of Europe. The hordes of Chinese who live on the river flood plains and deltas of the south and east make this the most densely settled large area on the globe.

Nevertheless, there are outlying provinces of great extent, such as Mongolia, Turkestan, and Tibet, where the population is very sparse. This is because of the rugged mountains and the vast desert plateaus where the dryness is unfavorable to all industries save herding.

Climate. — Most of the densely settled part of China has a temperate climate with an abundance of rain during the summer monsoon. In the north, for example near Peking, which is in about the

FIG. 431.

A scene in the arid mountainous part of China, where camels are used.

same latitude as Philadelphia, the summers are warm and the winters cold; but farther south, as at Canton, just south of the Tropic of Cancer, the climate is tropical, and there is rain throughout the year. Toward the interior the climate grows steadily drier, and, with increasing elevation, colder also.

The rains and snows of the Chinese mountains supply water for a number of large rivers. The two most important are the Hoang-ho

FIG. 432.

A part of the Great Wall of China.

and the Yangtse-kiang (Fig. 406), whose floods spread out over the broad deltas and flood plains, thus depositing sediment and adding fertility to the soil. The greatest rise, which in the Yangtse-kiang reaches a height of fully forty feet, occurs during the summer rains.

It is with great difficulty that the Hoang-ho is controlled, and in the last twenty-five hundred years its lower course has changed eleven different times. In some cases this has caused a change of three hundred

miles in the position of the river mouth. A single flood destroyed a million people. Because of the repeated destruction of life and property, the Hoang-ho has been called "China's Sorrow."

People and Civilization. — The Chinese Empire is inhabited by people of varied origin, with different customs, religions, and languages. The Mongolians, who form the basis of the population, apparently came from western Asia, bringing with them the knowledge of irrigation. Although China is partially protected on the

FIG. 433.

A scene in a public court of Shanghai.

west by mountain ranges and desert, the constant danger of invasion by nomads led, as early as 212 B.C., to the construction of the Great Wall (Fig. 432) along the northern frontier.

This wall, twelve hundred miles long in a straight line, and fifteen hundred miles with all of its windings, passes up and down hill (Fig. 432) and even over a mountain peak. It is twenty-five feet wide and thirty feet high, and at short distances apart are strong watch-towers rising still higher. This wonderful structure, which required armies of men to build, was so well made that it is still perfect in many places.

Long before Europeans had emerged from the state of barbarism, the Chinese had developed a remarkable civilization. The art of printing, the manufacture of gunpowder, the production of silk and silk goods, the baking of porcelain or china ware, and other important arts were known to them long before Europeans learned them.

But in spite of their early start, the Chinese have been outstripped by Europeans (p. 443). Their peculiar customs in part account for their failure to advance farther. They are followers of Confucius, and his doctrine is everywhere taught.

One of their doctrines is ancestor worship, which leads them to regard new customs as bad. This tends to check development, and is one of the reasons why they object to adopting European and American civilization. The strength of their ancestor worship is indicated by the fact that disobedience to parents is regarded in China as one of the worst of sins, for which children may be whipped to death. By law the punishment for striking a parent is death.

The conservatism of the Chinese is shown by their objection to the introduction of labor-saving machinery, and it is also shown by their methods of transportation. Much of the traffic is carried on by means of canals (Fig. 434), of which the largest is the Grand Canal (Fig. 403), built more than twelve hundred years ago.

FIG. 434.
A typical Chinese village and canal.

Many Chinese educated in the United States and Europe are the leaders of a "Reform Party" which, together with the educational influence of the Christian missionaries, who have worked midst great privations and danger for years among the Chinese, have been the means of awakening China to a realization of her natural resources and possibilities.

This means the opening of her ports to the commerce of the world, the introduction of modern educational methods and text-books into her schools, modern machinery and appliances for manufacturing and transportation, and the adoption of modern dress and customs.

This great awakening promises to place China eventually among the modern, progressive nations of the world.

National Resources. — Though many Chinese are engaged in fishing, both in the rivers and the ocean, they are in the main an agri-

cultural people. Their farming methods are very crude; yet they are so careful and industrious, and labor is of so little value, that they till every bit of land possible. For example, water for irrigation, instead of being distributed only over moderate slopes, as in the United States, is often taken to the very tops of hills. It is first raised from the river by means of wheels, turned either by men or by buffaloes, and then pumped upward from one terrace to the next until the whole hillside has been watered.

One of the principal foods of the Chinese is rice; but their main exports are tea and silk. Tea is raised on the damp hill slopes of the south, where the conditions resemble those in India (p. 456). Fully forty thousand men and women are employed in carrying tea into FUCHAU alone. They receive but ten cents a day for their labor. In the warm south, great quantities of silk are obtained, as in France, from the cocoon of the silkworm caterpillar. Some of the caterpillars feed on forest leaves, others are carefully fed on the mulberry leaf.

As in other countries of southern Asia, the bamboo is one of the most valuable products. The seeds are ground up for food, and in spring the tender roots and stalks are eaten. The roofs and walls of houses, as well as nearly all articles of furniture, are made of bamboo wood. It is, moreover, woven into mats, baskets, and hats, while paper is made from its pulp. There is almost no other kind of manufacturing, nor is there much development of the wonderful mineral resources. It is said that China contains the largest coal fields in the world, in which both bituminous and anthracite coal occur; and there are also deposits of gold, silver, lead, and iron ore.

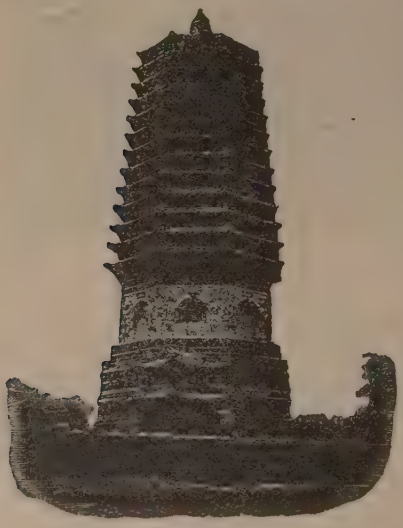


FIG. 435.
A Chinese pagoda or temple.

Government.—The Chinese government changed from a monarchy into a republic in 1912. A revolution resulted in the abdication of the emperor, Sun Hong, a boy seven years old, in January, 1912; and in the election of a president, by an assembly composed of two representatives from each of the eighteen provinces.

The government is modeled as closely as possible upon that of the United States, and consists of a president, his Cabinet, and the Assembly mentioned above. The right of suffrage is to be given to the people as soon as possible. The wearing of queues has been abolished. The Julian Calendar has been adopted.

Principal Cities. — There are many cities in China, all densely crowded. The poorer classes live huddled together, while the wealthier classes and officials dwell in comfort and luxury. The largest city is CANTON, which has about nine hundred thousand

FIG. 436.

The harbor of Hongkong.

inhabitants. It is situated on a densely populated delta and is a port of outlet for productive southern China, being especially noted for its silk. It is said that three hundred thousand people, or one third of the inhabitants, live in boats moored in the river.

HONGKONG (Fig. 436), an island which commands the approach to Canton, belongs to the British. To Hongkong many of the products of China are sent for export to Europe and America. It is therefore a very busy place. HANKAU and WUCHANG, on opposite sides of the Yangtse-kiang River, are important river ports for tea. As in the case of most Chinese cities, the number of inhabitants is uncertain, but Hankau is now supposed to have a population of about five hundred and thirty thousand.

The treaty port[1] of SHANGHAI is another large city; but TIEN-TSIN, the port nearest PEKING, and the northern terminus of the

[1] Foreigners are not allowed to trade in all Chinese cities, and those ports where this privilege is allowed by treaty are called "Treaty Ports."

Grand Canal, is larger, with a population of three quarters of a million. It was from this point that the allied forces started, in 1900, to relieve the foreigners who were besieged in Peking by the Chinese Boxers.

PEKING, the capital of China, is situated on a broad, sandy plain. It has been the capital of a kingdom for three thousand years and of the Chinese Empire for over eight centuries. This city, like others in China, is surrounded by a high wall, with gates that are closed at night, as of old in Europe. It is a rectangular city, with one portion reserved for the gardens and palaces of the imperial government. This part is known as the "Forbidden City," because the Chinese government refused to permit foreigners to enter it.

Korea. — This mountainous peninsula has a temperate climate and is adapted to the production of such crops as grains in the north, and rice, tobacco, and cotton in the south. In many respects the inhabitants resemble the Chinese; in fact, Korea was a dependency of China until freed by the war between China and Japan in 1894. While there are great natural resources, including both coal and iron, there was little real development, and the opening of the country to foreign influence was very slow until the close of the war between Russia and Japan in 1905. Since that time Korea has made much progress under the tutelage of Japan.

Japan. — This island empire extends from Formosa, captured from the Chinese in 1894, to the Kurile Islands far to the north. It also includes the southern half of the island of Saghalien ceded by Russia to Japan at the close of the great war of 1904–05. The location of the islands with reference to the mainland reminds us of the British Isles; and, in fact, Japan's isolation from other countries has secured to her the same freedom from invasion as has long proved of such advantage to the British.

Physiography and Climate. — Notwithstanding the great length of the empire, its narrow islands occupy an area but little greater than that of California. So much of this is mountainous that not more than one sixth of the surface can be cultivated, and many of the lowlands are difficult to reach because of the rugged surface and the absence of navigable rivers. There are numerous volcanoes (Fig. 405); and, since the mountains are still growing (p. 439), there are many earthquakes. These are so frequent and violent that in building houses the people must allow for their force.

Nipon, the main island of Japan, has a warm, temperate climate

and an abundance of rain. Other islands near by have a similar climate, but *Formosa* is partly within the tropics. Estimate its distance from Manila.

Under these conditions, in several respects so unfavorable, a dense population has developed, equal to more than half the number in the United States. In many ways the Japanese are the most advanced people in Asia.

People and Government. — In early times Japan was invaded by Mongolians from the mainland, who expelled the original inhabitants to the more barren northern islands. From these Mongolians are descended the present Japanese (see Figs. 274 and 412), a people noted for their smallness of stature and their wonderful artistic instinct.

FIG. 437.

A Japanese peasant family traveling.

Centuries before the time of Christ they had developed a civilization resembling that of their kinsmen, the Chinese. Their fine taste led to the manufacture of many beautiful articles of silk, metal, glass, and wood. Like the Chinese, they for a long time did not care for modern civilization, and closed their ports to the outside world. In 1853, however, United States warships under Commodore Perry entered Yokohama and induced the Japanese to open their ports to our commerce. After this important step the country, in 1868, was freely opened to the world.

One great drawback to the advance of Japan was the nature of the government, which resembled that of Europe in the Middle Ages. While the *Mikado* was nominally emperor, the real power was in the hands of noblemen who, by the feudal system, had large numbers of peasants, not only to work for them, but to fight when necessary. After the country was opened to foreigners the power

of the noblemen was lessened, and the Mikado became the real emperor. At present he is aided by two legislative bodies, one consisting mainly of noblemen, the other elected by qualified voters. There is also a Cabinet appointed by the Mikado, as the cabinet of the United States is appointed by the President.

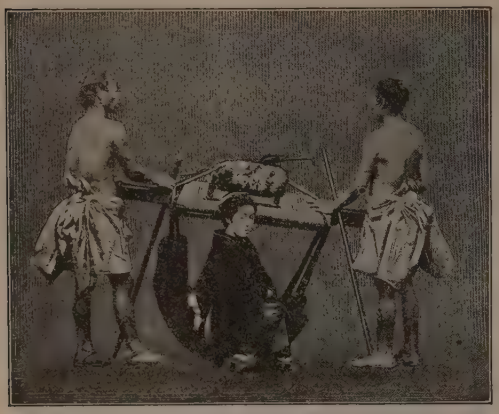


FIG. 438.

A Japanese traveling chair.

Recent Advance. — Since these changes the Japanese have become noted for their willingness to learn the lessons of Western civilization, and their progress has been truly marvelous. New schools have been started, and education has been made compulsory. Americans and Europeans have been induced to go to Japan to teach, and Japanese students have been sent to Europe and America to study in the universities and to learn what they could of Western civili-

FIG. 439.

A temple in Japan.

zation. Thus, in a generation the Japanese have added to their own knowledge that of Europe and America; and they have learned their lessons so well that, with their patience, skill, and intelligence, they alone of all the nations in Asia have taken rank with the great nations of the world.

Over seven hundred newspapers and periodicals are now published in Japan. While in 1872 there was only one short railway from Yokohama to Tokio, a distance of eighteen miles, there are now more than three thousand miles of railway in the empire. There are many large manufactories of various kinds; and, as in the British Isles, cotton and other raw products are imported for manufacture. There is a curious mixture of modern and ancient customs here (see Figs. 437–440).

Resources. — Among the mountains there are valuable deposits of gold, silver, copper, iron, and coal; and these are now well developed. The mountain sides are covered with forests of great value, including giant cedars, camphor laurels, and lacquer trees; and wherever the soil is favorable there is agriculture. Among the soil products are wheat, sugar cane, and rice, the latter being an important article of food. As in China, both tea and silk are produced, and these form two of the main articles of export. Much of our tea comes from Japan. Besides these industries, fully two and a half millions of people are engaged in fishing.

Principal Cities. — TOKIO, a city larger than Philadelphia, is the capital of Japan. Besides being the home of the Mikado, and therefore having many government buildings, it has numerous manufactories. YOKOHAMA, at the entrance to Tokio Bay, was a mere fishing village when visited by Perry; but since the harbor of Tokio is unsuited for the large modern ships, Yokohama has grown rapidly and now has the largest foreign trade in Japan.

FIG. 440.

Jinrikishas, or "man-power carriages."

Other important cities, having a population of several hundred thousand, are OSAKA, noted for its cotton manufac-

turing; KIOTO, the former capital, and the center of the tea district; and NAGOYA, a center for porcelain manufacturing, for which Japan has long been noted. All these are connected by railway lines, which have been a great aid in the development of their industries. State how.

FIG. 441.

Asiatic buffalo, used as a work animal in southern and western Asia, eastern Europe, and northeastern Africa.

REVIEW QUESTIONS — (1) Tell about the size of Asia; also its position with reference to the zones and other continents. (2) Tell about its physiography. (3) Describe the climate. (4) Tell about the plants and animals, showing the contrast between northern and southern Asia. (5) What about the use made of animals? (6) In what sections were the beginnings of civilization probably made? Why there? (7) Give reasons why Europeans have so outstripped the Asiatics. (8) Tell about the population of Asia and its distribution. (9) Why is Turkey in Asia of special interest to us? (10) Describe its surface, climate, and industries. (11) Why, and from what peoples, has Asia Minor suffered frequent invasions? (12) Tell about the Holy Land: its surface; climate; history; present condition. (13) Tell about Mesopotamia. (14) Describe the surface and climate of Arabia. (15) Tell about its government, products, and principal cities. (16) Give the main facts about Persia. (17) Do the same for Afghanistan. (18) Compare the area of Siberia with that of various countries of the world. (19) What about the resources and future of Siberia? (20) Tell about India: its climate and surface; population; agricultural products; forests and jungles; animals and plants; minerals; manufactures; famines and plagues. (21) How did the British gain control over India, and how is the control exercised? (22) Tell about Baluchistan and Burma. (23) For what are the countries at the base of the Himalayas important? (24) Locate and tell about the principal cities of India. (25) What can you tell about Ceylon? (26) Give the principal facts about Siam. (27) Do the

same for French Indo-China; for Straits Settlements. (28) Tell about China: area; number of inhabitants and their distribution; climate and rivers; people and their early civilization; reasons for their lack of development; recent awakening; agricultural products; minerals and manufactures; government; principal cities. (29) What can you tell about Korea? (30) Tell about Japan: position; area; physiography and climate; population; people and government; recent advance; resources; chief cities.

REVIEW AND COMPARISON WITH NORTH AMERICA.[1] — (1) How do North America and Asia differ in form, coast line, islands, mountains, direction of rivers, and deserts? (2) What other differences between the two continents can you mention? What resemblances? (3) Is the Canadian Pacific railway north or south of the Siberian railway? Which is the longer? (4) Is San Francisco north or south of Peking? (5) Name the three peninsulas of southern Asia; of southern Europe. Which of the six is nearest the latitude of Florida? (6) Name the large rivers of Asia and of Canada that flow into the Arctic Ocean. On a globe estimate the shortest distance between the mouths of the Mackenzie and Lena rivers. (7) How do the great rivers of China compare in length with the Mississippi? With the Volga? (8) How do the interior lakes and seas of Asia compare in value for commerce with our Great Lakes? (9) With what lake in North America may the Aral Sea be compared? (10) What ocean currents affect the climate of Asia? Of North America? (11) Compare the climatic belts of Siberia with those of Canada. (12) Is western Asia more or less suited to agriculture and commerce than western North America? Why? (13) In what portion of North America and Asia is rice cultivated? (14) Answer the same question for cotton. (15) What important crops in Asia are not extensively produced in the United States? (16) Name some of the leading imports from Asia to the United States. (17) What about mining in Asia compared with that in the United States? (18) Make the same comparison for manufacturing; for railways. (19) What is the prevailing kind of government in each of the two continents? (20) Compare the population of the five largest cities of Asia with the five largest in North America. (21) What are the advantages to the United States of its control of the Philippines? The disadvantages?

SUGGESTIONS. — (1) What do you know about recent massacres of Armenian Christians by the Turks? (2) Why, do you suppose, has Turkey not laid claim to all of Arabia? (3) Estimate the area of the Holy Land. (4) Make a sand or clay map of the Holy Land (Fig. 416). (5) Point out on the map (Fig. 416) some of the places often mentioned in the New Testament and describe some of the events that occurred there. (6) What Bible events have their scene in Mesopotamia? (7) Write a paper to show to what extent our present civilization is indebted to the Holy Land. (8) Find out some facts about the Crusades. (9) Find out the length of the railway across Siberia. (10) About how far is it by rail from Lisbon in Portugal to Port Arthur on the Pacific? (11) Read Kipling's Jungle Books. (12) Why should the Great Wall of China have less value now than formerly? (13) How is Peking poorly situated for the capital of so vast an empire? (14) Find out about our laws for the exclusion of the Chinese, and the reasons why they were passed. (15) Describe some of the events connected with the siege of the legations and the relief expeditions sent to Peking in 1900.

For REFERENCES, see *Teacher's Book.*

[1] Aid in answering some of these questions may be obtained in section beginning on p. 219, and the Appendix.

II. AFRICA

Physiography. — Africa, the second continent in size, resembles South America in outline. Its form is roughly that of a triangle, broad at the north and tapering toward the south. The coast line is remarkably regular, in striking contrast with the coast of Europe, Asia, and North America, and resembling that of South America and Australia. What must be some of the consequences of such regularity? What gulfs, seas, and large islands are found on the map of Africa.

Africa differs from all other continents in its mountain systems. It is mainly a plateau, but near the coast the plateau edges are broken and the rocks upturned, so that there is an almost complete mountain rim. Trace this rim (Fig. 444); from what part of the coast is it absent? In northern Africa the Atlas ranges reach an elevation of fourteen thousand feet; but the loftiest mountains are in the east central part. Among the latter is the volcanic cone of Kilimanjaro, the highest peak on the continent. Find this peak and trace the mountains from there northward. Notice the elevated land in Abyssinia.

Owing to the mountain rim the rivers of Africa are peculiar. For instance, the Niger, after rising among the highlands near the west coast, sweeps around in a great curve before entering the Atlantic. The Zambezi, in the south, also rises near the west coast, but crosses the continent eastward to the Indian Ocean. The Victoria Falls of the Zambezi River (Figs. BB and CC, p. 473) rival even the Niagara Falls in grandeur. The falls are more than a mile wide, but are divided by islands into three sections, one about 100 feet wide, and the other two about a half mile each. The whole enormous volume of water falls four hundred feet into a chasm shut in by perpendicular walls of basalt. Great clouds of vapor (Fig. EE, p. 496) rise 800 feet above the brink of the falls, and many rainbows appear in the mist. Although both wider and higher than Niagara, the volume of water is less. How high are the Niagara Falls?

Trace the courses of the Nile and the Kongo, the two largest rivers. In descending from the plateau each of these streams is interrupted by rapids and falls. Find the Victoria Falls of the Zambezi (Fig. 443); the cataracts of the Nile; also Leopoldville on the Kongo, below which

Photo by F. W. Sykes.

FIG. BB.

Victoria Falls — "Leaping Waters" at crest of falls.

Photo by F. W. Sykes.

FIG. CC.

Victoria Falls — Part of main falls

Fig. DD.

A cluster of palms near the Pyramids in the desert region of Egypt.

FIG. 442.

Some of the African animals.

Fig. 443.

Map Questions.—(1) Compare the size of Africa with that of the other continents. (2) Sketch the eastern hemisphere to show the position of Africa. (3) Sketch the outline of Africa, and locate the principal rivers and lakes. (4) What peculiarity do you notice about the location of the mountains? (5) What zones cross Africa? (6) What kind of climate (temperature and rainfall) would you expect to find (*a*) in the extreme north; (*b*) in the extreme south; (*c*) at the equator; (*d*) near the tropics? (7) Find the desert country north and south of the equator. Explain its cause. (8) How does it happen that the Nile has water enough to flow so far through the desert? (9) In what sections are the most railways? What reasons can you suggest? (10) Where are the large cities? Compare their number with those in other continents. Why should there be this difference?

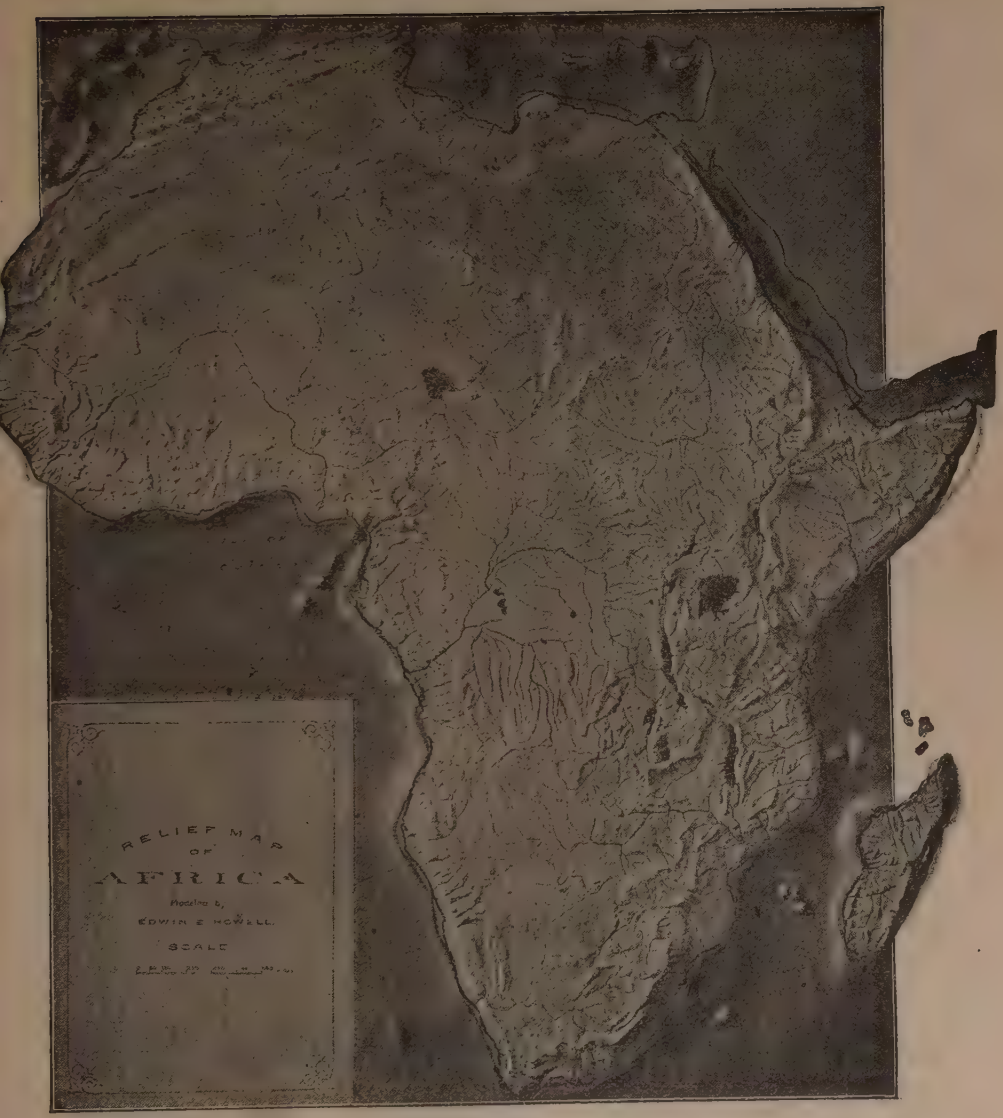


Fig. 444.

are some falls. Rapids also occur in the Niger. How will these great rivers compare, therefore, with the Mississippi or Amazon as routes for commerce? How must these falls affect the development of Africa? In one part of Africa there are several large lakes. Name the three largest. Into what rivers do they empty?

Climate. — The equator crosses so near the middle of Africa that only the northern and southern ends are in the temperate zones. Therefore the climate of most of the continent, like that of South America, is tropical. Since the altitude of so much of Africa is so nearly uniform, the belts of climate extend nearly east and west. What is true in this respect of South America?

FIG. 445.

To show the influence of climate on vegetation. In the savanna area there are numerous forest-covered sections, especially near the rivers.

In equatorial Africa, that is for some distance both to the north and south of the equator, there is such a hot, rainy climate that, as in the Amazon valley, the land is densely covered with a tropical forest (Fig. 445). This is especially well illustrated at the base of the plateau, where the narrow strip of coast land is hot, reeking with moisture, and the seat of deadly malaria. These conditions have greatly interfered with exploration, for disease is apt to seize white men even while they are crossing the coastal strip.

The interior, owing to its greater elevation, is somewhat cooler and less unhealthful; but even there tropical heat and rain prevail in the equatorial belt. It is this heavy rainfall that supplies the Kongo and Nile with their immense volumes of water. Both to the north and to the south of the rainy equatorial region is the savanna belt (Fig. 445), where the rainfall varies with the season. Why? (p. 254.) What are the conditions in the savanna? (p. 288.)

As the tropical forest grades into the savanna, so the savanna grades into the true desert (Fig. 445, also p. 480), where the influence of the drying trade winds is felt at *all* times of the year. The northern desert is larger and better developed than that south of the equator. This is due partly to the fact that the continent is so broad in the north, and partly to the large land areas which lie to the north and east — the directions from which the winds of northern Africa must come. On the mountain slopes near the Mediterranean there is moderate rainfall; and likewise on the southeastern slopes of South Africa where the winds blow from the sea.

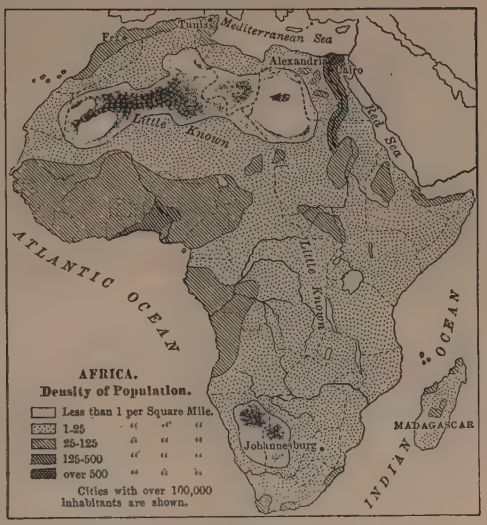


FIG. 446.

Plants and Animals. — Northern Africa is so close to southern Europe that there is a marked resemblance between the animals and plants on the two sides of the Mediterranean. The desert, however, serves as an effective barrier to their spread southward.

Portions of the desert, especially where covered with dunes of moving sand, are almost void of plant life. Animals are also few in number and limited in kind, among them being the ostrich (Fig. 442) and the camel. The oases (Fig. 465), on the other hand, support a number of plants. Of these the date palm is most notable, for it is an important source of food for the nomads of the desert.

The open country between the desert and the tropical forest abounds in large animals (Fig. 442). Among these, on the savannas, and on the edge of the forest, are the antelope, giraffe, buffalo, zebra, elephant, lion, leopard, and rhinoceros, while the crocodile and the huge hippopotamus live in the rivers. The dense forest itself is shunned by many of the larger forms, though teeming with insect life, birds, reptiles, and tree-dwelling mammals. Among the latter are the baboon, the gorilla, and the chimpanzee (Fig. 442).

The People. — Central and southern Africa is the home of the negroes, who are divided into many tribes with different customs. Some are fierce and warlike; others peaceful; those dwelling in the forest live by hunting; those upon the savannas, by primitive agriculture and by herding. For centuries they were captured by the whites and sold in slavery, but the day of the white slave trade is now almost past. In spite of the former frequency of slave-hunting raids, and the great destruction of life in the fierce tribal wars, there are many negroes left. With a fertile soil, and in a warm climate, they are able to support themselves with a minimum of work, especially along the rivers and on the savannas.

FIG. 447.
An African negro woman planting.

While the forest and much of the savanna have been dominated by the negro even down to the present day, the arid sections of northern Africa have been held by the whites since very early times. Near the border line between the two races there has been such a mixture of blood that the population is largely one of half-breeds.

Exploration and Settlement. — The Indies, famed for their precious stones, spices, and other valuable products, were reached by long journeys overland. But even before the famous voyage of Columbus, the Portuguese — the most progressive sailors of that day — were engaged in an attempt to reach these distant lands by sailing around the southern end of Africa. After various voyages, the Cape of Good Hope was finally passed and the way to the Indies by water was opened in 1498.

The Portuguese made settlements on the east and west coasts of Africa, and they still have extensive possessions there (Fig. 443). But progress toward development and settlement has been slow for various reasons, among which perhaps the most important is the fact that so much of Africa is tropical. The desert is forbidding, and the hot, damp climate of the coastal strip, upon which colonies were naturally first established, was found particularly unhealthful (p. 476). In addition, travel into the interior was prevented by hostile hordes of blacks, and by the absence of navigable rivers. Moreover, those who were willing to leave Europe were more attracted toward the continents of Australia and America. Why should they be?

By far the most successful settlement in the newly discovered parts of Africa was that made by the Dutch at Cape Colony, a little later than their settlement of New York. As in the case of New York, the British seized their territory.

During the nineteenth century Livingstone, Stanley, and others entered the "dark continent"; and since their efforts, exploration has been rapid. Many European nations have taken part in the exploration, and as a result have claimed territory. But the British have been by far the most active. What other nations have possessions there? (Fig. 443.)

Northern Africa

Political Divisions. — Much of northern Africa is such a desert that its inhabitants are few and scattered. It is, however, under the control of various nations. The greater part of the Sahara is claimed by the French, though the Spanish hold a small section on the western coast, and the British control both the Libyan desert and the Egyptian Sudan in the east. Along the Mediterranean

Fig. 448.

A pyramid in the desert near Cairo — one of the remarkable works of the ancient Egyptians.

coast are several well-settled sections, the best known being Egypt. The four countries west of Egypt — Tripoli, Tunis, Algeria, and Morocco — are often called the *Barbary States* (the home of the Berbers).

The Sahara. — From the Atlantic to the Red Sea, and from near the Mediterranean to the grass lands of the Sudan, there is almost unbroken desert — the famous Sahara. Its area is estimated to be from three to four million square miles, or about equal to that of the entire United States. It is a plateau of uneven surface, with mountain ranges here and there, and bordered on the north by the Atlas Mountains. The wind-swept highlands are bare and stony, while the lowlands have extensive areas of sand dunes.

Much of the soil is fertile, and with rainfall would yield abundant crops. But nature has forbidden rain, and its surface is therefore barren in the extreme. Only on the oases, of which there are some four hundred in the Sahara, is there the necessary drinking water which renders human life possible in the desert.

Caravans cross this desert, one of the important routes being from Tafilet in Morocco, southward to Timbuktu. There may be from a thousand to fifteen hundred camels in one caravan, and a full year may be required to equip it. Each camel is carefully selected by the chief of the caravan, and many extra camels are taken along to replace those that give out on the journey. There is one driver for every dozen camels.

FIG. 449.

A nomad camp on the northern edge of the Sahara.

Upon starting, the loads are carefully packed on the camels' backs, each animal bearing about three hundred pounds. A day's march lasts sixteen hours, the camels traveling some thirty abreast at the rate of about two miles an hour. Ordinary camels cannot travel more than three days without drinking; but the better grades are able to go for six or seven days without water and with almost no food. The trip across the Sahara,

from north to south, requires fully three months. Estimate the distance. At best nearly a third of the animals perish in the round trip; and before the return journey is undertaken it is necessary for those surviving to have a rest of several weeks.

An advance party precedes the caravan to make arrangements for camping and for water. Many roundabout journeys are necessary to pass deep valleys and plateaus, for caravans go around rather than over obstacles. The daytime is hot; but as soon as the sun sets, the temperature rapidly falls and the nights become cold even in midsummer.

There are dangers in the journey aside from that of thirst. Sometimes sand storms arise; and although such a storm may not last a half-hour, it may destroy a whole caravan. The wind blows violently, and sand fills the air and drifts about in such quantities that animals and men alike are suffocated in the drifts. Also small caravans may be attacked by wandering tribes of warlike natives; and near the southern edge of the desert the danger from attack by the lion is added. It evidently requires courage and great powers of endurance to engage in the caravan trade.

Caravans which cross the desert carry the products of central Africa to the coast. These include ivory, skins, and ostrich feathers obtained by bartering with the negroes.

Egypt and the Neighboring British Territory. — Egypt proper and the Libyan desert are parts of the broad Sahara and have all the features of the desert just described. Even at Cairo the average yearly rainfall is but an inch and a half. In climate, both for summer and winter, northern Egypt closely resembles the desert portion of western Arizona and southeastern California.

The Nile. — The Egyptian Sudan and the country south of it, on the other hand, have a tropical climate, arid in the north, but warm and humid in the south, where the influence of the tropical rains is felt. The headwaters of the Nile, near the equator, are fed

FIG. 450.
Sudanese people from the Egyptian Sudan.

by such heavy rains that the river is able to flow across the desert in spite of the fact that no tributaries enter the lower half of its course. How great a distance is that?

Without the Nile the whole of northern Egypt would be a sparsely

FIG. 451.

The lower Nile. The shaded area between the two deserts is farming land which is reached by water from the river. The numerous crossed lines are railways. Find the Pyramids. Why is the location at the head of a fertile delta, and at the outlet of a narrow river valley bounded by desert, a favorable one for a large city?

inhabited desert (Fig. 448); but the precious river waters transform the section near the Mediterranean (Fig. 451) into a great oasis which has become the seat of an important agricultural industry, and is densely populated.

After leaving the region of equatorial rains and the savannas, the Nile crosses the desert through a valley — in places a thousand feet in depth — which it has cut in the plateau. In this part of its course there are several cataracts (see Fig. 443). The Nile resembles the Colorado River of the United States, which, after leaving the Rocky Mountains, flows in a deep canyon across the arid plateau of Arizona; but the canyon of the Colorado is much deeper than that of the Nile. Below Cairo the river leaves its narrow valley, divides into several channels, and flows across a plain (Fig. 451). This plain is the *delta* which the Nile has built in the Mediterranean

FIG. 452.

The Sphinx and two of the Pyramids.

Sea during the ages that the river has been bringing sediment from its upper course. It is the Nile that suggested the geographical term, delta, now applied to similar deposits at the mouths of rivers in various parts of the world. The word comes from the Greek letter delta (Δ), which has the form of a triangle. Notice that shape in Figure 451.

When the rainy season comes to the Nile tributaries among the Abyssinian mountains, the river rises so high that it overflows large tracts of the broad delta below Cairo. The rise begins in June and reaches its height in October. By this overflow not only is the land irrigated, but a thin layer of fine mud is spread over the fields. This serves so to fertilize the soil that, year after year, heavy crops may be raised without making the soil sterile.

Agriculture. — In consequence of these remarkably favorable conditions, the Nile delta has been occupied by an agricultural people from the very earliest times. It is still the seat of a great grain industry, producing wheat, corn, millet, and barley. Much rice and sugar cane are also raised, and cotton which is of especial value because of its long fiber. There are many vineyards, and orange, lemon, and fig groves ; and both along the Nile and on the oases of the desert there are groves of date palms (Fig. DD, p. 474). Grazing is of importance in the Nile Valley and on the neighboring plateau. The animals raised include the buffalo and camel in addition to sheep, goats, cattle, horses, and donkeys.

The People. — The known history of Egypt reaches back several thousand years before the time of Christ. The fertile soil and favorable climate, added to the protection from frequent wars which the surrounding desert and sea afforded, encouraged the development of industry and thrift. By the mixture of agricultural and pastoral races there arose a civilization in advance of that of the neighboring sections of Europe and Asia. In fact, at the time when Europe was inhabited by barbarians, and the peoples of western Asia were unorganized, Egypt had made long advances in civilization.

Fig. 453.
An obelisk in Egypt.

We read in the Bible of the Pharaohs who ruled over Egypt. Can you recall any of the Bible stories which relate to these rulers; for example, the story of Joseph? During those times the Egyptians built the obelisks (Fig. 453), the sphinx (Fig. 452), and those marvelous structures the pyramids (Fig. 448), which are really the tombs of kings. By a peculiar process they preserved the bodies of their dead, and these *mummies* may be seen in the museums of many large cities. Among the mummies are the remains of the Pharaohs themselves.

In the movement westward of the people who dwelt along the eastern shores of the Mediterranean and farther east in Asia, Egypt became one of the highways of the world. Against its people many destructive wars were waged, and the country has been repeatedly invaded. As other nations have advanced, the Egyptians have steadily lost ground.

At present Egypt is required to pay annual tribute to Turkey, but she is otherwise practically independent of Turkey; and the ruler, or *Khedive*, is an hereditary monarch. The government of Egypt was so bad that the French and British finally stepped in and took control of the finances of the nation. When the French declined to aid in subduing a rebellion in Egypt, the British alone assumed a large share in the control of Egyptian affairs.

As a result of British direction there has recently been marked progress in Egypt. Extensive irrigation works have been under-

FIG. 454.
The Suez Canal at Port Said.

taken, and the land area for cotton and sugar cane has thereby been greatly increased. By means of reservoirs and canals it is further proposed to reclaim thousands of square miles of the desert. Several railway lines have also been built (Fig. 451), including a part of the proposed line from Cairo to Cape Town. Outside of the Nile Valley, however, travel still depends largely upon the use of camels (Fig. 448).

Suez Canal. —Northeastern Egypt includes the Isthmus of Suez, which connects Africa with Asia. This narrow neck of land has for centuries stood as a barrier to water travel from Europe to southeastern Asia, compelling European vessels to pass all the way around Africa in order to reach southern Asia.

The Suez Canal, begun in 1859, was completed in 1869. It extends from SUEZ to PORT SAID (Fig. 443), and is eighty-seven miles long, with a depth of twenty-six feet and a width at the surface varying from sixty-five to one hundred and twenty yards. Its length is much greater than that of the proposed Panama Canal, but the difficulties of construction were less. The country is very level, and a part of the course (about twenty-one miles) is through a lake. Ten vessels on an average pass through the Suez Canal each day. Estimate the distance saved by this canal in going from London to Calcutta. By agreement among nations it cannot be captured and closed in time of war.

Cities. — At the head of the delta, just above the point where the Nile branches (Fig. 451), is Cairo, the capital and largest city of Egypt and, in fact, of all Africa. It is about the size of St. Louis, having a population of 570,000. This interesting place is visited each year by a stream of tourists, some seeking a winter health resort, others attracted by the strange life of the country and the remarkable ruins of the old civilization (Figs. 448, 452, and 453).

Cairo itself contains the palace of the Khedive, several interesting mosques, and a museum in which are preserved many Egyptian antiquities and works of art. The inhabitants also attract attention, for in the streets may be seen many people with different languages and peculiar customs. The differences among the people may be illustrated by the following fact: there are three Sabbaths each week, Friday, the Sabbath of the Mohammedans, Saturday, observed by the Jews, and Sunday, by the Christians.

FIG. 455.

An Arab school in the streets of Cairo.

ALEXANDRIA, connected with Cairo by rail (Fig. 451), is the seaport of Egypt and the second city in size in the country. The chief business is the export of cotton, sugar, grain, and other Egyptian products, and the importation of manufactured goods. More than half the trade is with Great Britain.

The Barbary States. — Find the position of each of these four countries. Each borders the Mediterranean, but extends southward into the desert (p. 479).

The Atlas Mountains skirt the Mediterranean coast from the Atlantic to Tunis, where their projection into the Mediterranean forms the most northerly point in Africa. These mountains contain many valuable mineral products, including precious metals in Morocco and Algeria, and marble and alabaster in the latter country.

FIG. 456.
The costume of women in Algeria.

Since the Atlas Mountains cause vapor to be condensed when winds blow from the ocean or from the Mediterranean, many of the valleys are well watered. Forests cover some of the mountain slopes, and one of the valuable trees is the cork oak, the bark of which is removed for shipment from Algeria to Spain and Portugal. Camels, sheep, goats, and cattle are raised among the mountains and upon the plateaus.

FIG. 457.
Church of Notre Dame in Algiers.

Agriculture is carried on here and there, often by means of irrigation, with water supplied by the mountain snows and rains, as in southern California. The villages are therefore situated where valleys open to the plains. Among the crops produced, besides dates and grains, are figs, grapes, and olives. Wine from the grapes of Algeria is shipped in large quantities to France; and the best olive oil and the best dates in the world come from Tunis.

The original occupants of this region, the *Berbers*, still dwell on the desert and among the mountains, having been driven there long ago by invading Arabs. Most of the inhabitants are Mohammedans. Tripoli is still a Turkish province, but Tunis and Algeria are held by France. However, the native ruler, or *Bey*, of Tunis is permitted to

direct affairs in his country under the supervision of France. Morocco is the only one of the Barbary States that maintains independence, being ruled by an absolute monarch, or *Sultan*. Can you suggest why the conflicting interests of Spain, France, and England should prevent conquest by any one?

Conditions of life in Morocco are shown by the following: The writer once visited a school in Tangier consisting of a dozen boys from nine to ten years of age. The room where they studied received its only light from the open door, and it contained no seats, desks, or furniture of any kind. The children sat on the floor in a semicircle around a long-bearded old man, who likewise sat on the floor, and the only object they had before them was a page from the Koran, or Mohammedan Bible. What does such a condition of education indicate in regard to progress? If this is the case on the coast, almost within the shadow of Europe, what must be the condition farther inland?

The capitals are the principal cities among the Barbary States. FEZ, one of the capitals of Morocco, is in the interior; but the Sultan and his court do not reside there all the year. Name the other capital. TANGIER, on the coast, is better known. Why should it be? In Algeria, the seaport ALGIERS is the capital and largest city. It is an interesting place, combining many features of ancient and modern times. Under the French it has become an important trading center. The same is true of TUNIS, the capital of the country by that name. Locate the capital of Tripoli.

SOUTHERN AFRICA

Comparison with Northern Africa. — In some important respects there is a resemblance between northern and southern Africa, although they lie in different hemispheres. What similarities are there in climate (p. 476) and physiography (p. 472)? There is a resemblance, too, in the fact that both sections have long been settled by white men. What difference is there in the length of occupation by white men?

The People. — It is to the Dutch that we owe the first important development of South Africa. Settling at Cape Town, and then spreading over the neighboring region, they took possession of the country occupied by the negroes and introduced the European industries of farming and ranching.

When Cape Colony came into possession of the British (p. 479), many of the Dutch remained; but others emigrated, or "trekked," northward and found new homes in the interior. There they

established two republics, the Transvaal and the Orange Free State, in which they desired to continue the customs of their forefathers and live in the pursuit of agriculture and herding.

Doubtless the *Boers*, as these people are called, would have been left to themselves but for the discovery of wonderfully rich depos-

FIG. 458.
A Zulu woman making a straw mat.

its of gold. The mines were developed by British capital, and friction arose between the mine owners and the Boers. War followed, as a result of which the Transvaal and the Orange Free State were declared British colonies in 1900.

At present, therefore, the British control a broad strip from the southern tip of Africa northward to the southern end of Lake Tanganyika. What are the names of the British colonies in South Africa (Fig. 443)? What nations control the land to the east and west of the British possessions? Besides the Boers there are many British in South Africa, especially in Cape Colony and at the gold mines

FIG. 459.
A pineapple field in South Africa.

of the Transvaal. There are also large numbers of negroes in this region, particularly in the tropical section and in Zululand in northern Natal (Fig. 458). Some of them, like the Zulus, have fiercely opposed the encroachment of the whites and still maintain semi-independent states. They are, however, making rapid progress toward civilization.

Agriculture and Grazing. — Along the east coast, and in some of the interior valleys, agriculture is an important industry. Sugar,

FIG. 460.

Cattle in the Transvaal.

bananas, pineapples (Fig. 459), tea, coffee, and rice are raised near the coast, where the climate is warm and damp. But wheat, tobacco, vegetables, and grapes are produced in the cooler south, and upon the uplands wherever the rainfall is sufficient or irrigation possible.

By far the greater part of South Africa is an arid plateau, and its elevation causes cold winters in spite of the latitude. Forests are absent, and little wood is found except that which comes from the thorny acacia bushes of the plains, and the willows and other trees that grow along the streams. Except in the real desert the grass springs into life after the summer rains (November and December), and the country becomes green and beautiful. Then follows a long drought, when the vegetation withers. But, as in the arid part of western United States, the dried grass is a sort of natural hay upon which cattle and sheep thrive.

Upon this plateau, therefore, immense numbers of cattle, sheep,

and goats are raised, and also many ostriches. It is estimated that in Cape Colony alone there are over eighteen million sheep and goats, nearly two million cattle, and three hundred and fifty thousand ostriches. In consequence, the production of wool, hides, meat, and ostrich feathers is of great importance. Of what value are these products to Great Britain?

Mineral Wealth. — The discovery of gold in South Africa has brought great changes, as among the mountains in the arid section of western United States. This metal is found scattered through a conglomerate rock in the Transvaal, near the city of JOHANNESBURG, which on that account has become the largest city of South Africa. This district has become the most important in gold production in the world; in 1906 more gold was mined here than in the entire United States.

Other valuable minerals, including copper, iron, and coal, also occur; but as yet they have been little developed. At KIMBERLEY in Cape Colony, however, are diamond mines, which now supply ninety-eight per cent of the world's diamond product.

The diamonds occur as rough crystals in a decomposed volcanic rock, and are obtained by digging out the soft rock and carefully removing

FIG. 461.

Cape Town, with Table Mountain (3500 feet high) in the distance.

the crystals. After this the crystals must be cut into the proper shape and polished. There are various grades, some clear and beautiful, others impure and dull. So productive is this deposit of precious stones that $160,000,000 worth have been removed in eleven years. There is only a limited demand for diamonds; but the company in control is careful not to mine enough of them to reduce the price greatly. This is possible, since the Kimberley mine owners have practically a monopoly of the diamond production of the world.

Commerce and Cities. — The two chief rivers of South Africa are of little use as trade routes. The Orange River is not navigable, because of lack of water and the presence of rapids at the edge of the plateau. The other, the Zambezi, is navigable by small boats for a

FIG. 462.

A scene at the market in Kimberley. Oxen are extensively used by the Boers as draught animals.

distance of three hundred miles from its mouth; but the climate near the coast, especially on the delta, is warm and unhealthful. Rapid water checks further navigation, for at this point are the Victoria Falls (Figs. BB, CC).

Nor is the coast especially favorable to commerce. For long distances there are no good harbors, while the river mouths are choked with sand bars which render entrance difficult. A breakwater has made Table Bay a good port, and around its shores, beautifully situated at the base of the Table Mountain (Fig. 461), is CAPE TOWN, the capital and largest city of Cape Colony. It is connected with the interior by a railway line, the southern end of the proposed railway from Cape Town to Cairo.

A second important harbor is that of Delagoa Bay, upon which is situated Lourenço Marquez, the capital of Portuguese East Africa. Being connected by rail with the interior, this port has been much used for the shipment of Transvaal products. Durban, the seaport of Natal, is a small city also connected with the Transvaal by rail. The two principal interior cities are Kimberley and Johannesburg (p. 491). There is no important town in German South Africa, which is for the most part an arid plateau. To what nation does *Walfisch Bay* belong?

Central Africa

This vast area is in large part a great unknown. Much of it is tropical forest; but on the northern and southern sides are open savannas (p. 288).

The Rivers. — Owing to the heavy rainfall of the forest belt, the rivers are large. The Nile and Zambezi, already described, and the Niger and Kongo, all receive water from the equatorial rains. The Niger is navigable in sections; but there are rapids in some parts, and in its northern portion the river dwindles in size because of the dry climate.

It is the immense Kongo, which empties into the sea a few degrees south of the equator, that offers the best means of entrance to Central Africa. Although it is interrupted by a series of falls a short distance from the coast, above Stanley Pool there are thousands of miles of navigable waters in the main river and its tributaries.

It was Stanley who first explored the Kongo, in 1876; and since that time this part of Africa has been rapidly developing. Formerly it was necessary to carry goods around the rapids, each native porter carrying about sixty pounds. Only in this way was Stanley able to carry his boats to the navigable portion farther up stream. Now, however, a railway two hundred and fifty miles in length connects the lower Kongo with Leopoldville on Stanley Pool above the falls. Thence, at all seasons of the year, steamers may go a thousand miles up the river and also into many tributaries.

The People. — Very few Europeans have settled in Central Africa, and the native blacks live almost as their ancestors did. Most of the inhabitants live in ingeniously built huts clustered in villages (Fig. 464). They have a kind of tribal government, each tribe having a leader whose power is absolute, and under whom are minor chiefs. Some of the tribes are cannibals. In religion they vary greatly, though all are intensely superstitious (p. 278).

Among the blacks none are more remarkable than the *pygmies* whom Stanley discovered in the equatorial forests, where large numbers live in an area of about thirty thousand square miles. The adults are only three or four feet in height. They live exclusively by hunting, by gathering

FIG. 463.

A steamer on the Kongo.

the vegetable products of the forest, and by theft from the neighboring agricultural tribes. Their villages are usually built in the forest where two paths cross, and the huts are shaped like a turtle's back, being about four and a half feet high, ten feet long, and five or six feet wide. In that hot climate they find little need for clothing.

FIG. 464.

A view on the savanna of Africa, a negro village in the foreground.

With a small spear, a short bow with poisoned arrows, and a knife, they hunt with wonderful skill, and by means of pitfalls they capture even the elephant. They know the forest intimately, and neither bird nor beast can escape them. According to Stanley they offer one of the greatest obstacles to exploration; for they appear stealthily, attack a party with great courage, and then disappear in the trackless woods.

Divisions of Central Africa. — European nations have been active in claiming the greater part of Central Africa; but their control over the native inhabitants is merely nominal, and the boundaries of the different sections are not well defined.

The Sudan includes the vast area between the Sahara and the

FIG. 465.

Oasis of Biskra in the Sahara.

tropical forest. What can you tell about its climate? (p. 476.) More than half of the Sudan is claimed by the French, and most of the remainder, including the *Niger Territories* and the *Egyptian Sudan*, is held by the British. The inhabitants are nomadic in the north, and agricultural in the south, though they raise little more than is needed for their own use. There is some gold in the west; but the principal products are ivory, ostrich feathers, and gums.

East of the Sudan is *Abyssinia*, which is for the most part a rocky plateau crossed by mountains and difficult of access. Its condition is indicated by the fact that the capital is periodically changed when the supply of firewood is exhausted. It is evident, therefore, that there are no government buildings. The inhabitants are mainly whites belong-

Photo by F. W. Sykes.

FIG. EE.

Victoria Falls — Chasm and Livingstone Island.
Notice the vapor rising, obstructing view of falls.

ing to very different tribes which are often hostile to one another. Many of the people still hold to Christianity, notwithstanding the invasion by Mohammedans nearly four centuries ago. Italy holds *Eritrea* and *Italian Somaliland*. What other nations occupy a part of the coast on the border of Abyssinia?

The map shows several small countries on the west coast of Africa in the part marked *Upper Guinea*. Find *Lower Guinea*. The divisions colored pink belong to the British; those marked green to the Germans.

One of the divisions of Upper Guinea is *Liberia*, which is of special interest to Americans. It is a negro republic established by Americans as a home for freed slaves, and its capital, MONROVIA, is named after President Monroe. No white man is permitted to become a citizen. Besides uncivilized negroes in the interior, the republic includes fully twenty thousand negroes with some knowledge of civilization, all living near the coast. The coastal strip is damp and unhealthful; but behind it is the forest-covered plateau slope. The products are chiefly coffee, palm oil, and sugar. It was the example set by the British in founding *Sierra Leone* as a home for liberated slaves, that led to the establishment of the republic of Liberia.

Kongo State, crossed by the equator and drained by the Kongo and its tributaries, was founded by the king of Belgium, who supported Stanley in his explorations of this region. It is in large part a forest-covered plateau; but there are sections of grass land. Hordes of savages, including the pygmies, inhabit the forests and savannas; the buffalo, elephant, and leopard live on the plains; and the roar of the lion is frequently heard.

Through the building of the railway around the cataract of the Kongo, and by the aid of steamers above and below the falls, the resources of this great area are beginning to be drawn upon. From it are obtained large quantities of ivory, rubber, palm oil, gum, and pepper, as well as tropical woods.

East of the Kongo State are British and German territories. What are they called? What is their climate? What products would you expect? Observe to what extent the British claim Africa. What break is there in the British territory between the Cape of Good Hope and the Mediterranean? What variety of climate does the British territory include?

Need of Railways. — One of the great needs of Central Africa is railways for transportation to and from the sea. The three large lakes, Nyassa, Tanganyika, and Victoria Nyanza, are of great service in the transportation of goods, and already there are steamers upon them. Elsewhere caravans of native porters bear the products on their backs, traveling along narrow paths through the forest.

As a result of British and German energy we may expect that railways will soon reach the various parts of the interior of Africa, in fact a railway to Victoria Nyanza is already well under way (Fig. 443).

Islands near Africa

The large island of *Madagascar*, which is larger than any of our States except Texas, is two hundred and thirty miles from the mainland. There is much highland in the country, especially on the eastern side, but the coastal region is lowland. The island is controlled by the French, and produces cattle, hides, valuable tropical woods, rubber, and coffee. While there are some Arabs, and tribes of negro origin in the west, the natives are for the most part Malays, called *Hovas*, who came by water from the northeast.

Of the many small islands near the coast of Africa the northernmost are the *Madeira Islands* on the west side. These, together with the *Cape Verde Islands* farther southwest, have belonged to Portugal since the early Portuguese voyages of discovery. The Spanish *Canary Islands* lie between these two groups. Find other islands along the west coast (Fig. 443) which belong to Spain and Portugal.

Ascension Island and *St. Helena*, south of the equator, are, like the above-named groups, volcanic. They belong to Great Britain, and St. Helena attained notoriety as the prison home of Napoleon Bonaparte. The principal small islands on the eastern side of Africa are *Zanzibar* (British) near the coast, *Réunion* (French) and *Mauritius* (British) east of Madagascar. Locate each of these (Fig. 443). Find other French and British islands. These islands are of value as naval stations. Their inhabitants are engaged in fishing and in agriculture, raising sugar cane and other tropical products.

Review Questions. — (1) What is the shape of Africa? (2) Compare the coast of Africa with that of other continents. (3) Tell about the highlands; the rivers and lakes. (4) Describe the belts of climate, and compare them with those of South America. (5) Tell about the plant and animal life. (6) Tell about the people. (7) Tell about the exploration and settlement. (8) What have been some of the principal obstacles to such explorations and settlements? (9) Name and locate the Barbary States. (10) What portions of northern Africa are under the control of European countries? (11) Describe the Sahara. (12) Describe the caravan trip. (13) Tell about Egypt: the climate; the Nile River; agriculture; people and government; Suez Canal; principal cities. (14) Describe the Barbary States: their raw products; manufactures; commerce; inhabitants; government. (15) State resemblances between northern and southern Africa. (16) Tell about South Africa: the people; agriculture and grazing; mining. (17) What about the value of the Orange and Zambezi rivers for commerce? (18) Locate and tell about each of the cities: (*a*) Cape Town; (*b*) Lourenço Marquez; (*c*) Durban; (*d*) Kimberley; (*e*) Johannesburg. (19) Tell about Central Africa: the climate and rivers; the people and their customs. (20) Name and locate the principal divisions of Central Africa. (21) Tell about: (*a*) the Sudan; (*b*) Abyssinia; (*c*) Somaliland; (*d*) Liberia; (*e*) Sierra Leone; (*f*) Kongo State. (22) What about the need of railways?

FIG. 466.

Some Australian animals. The platypus lays eggs like a bird or reptile. The kangaroo, like other marsupials, carries its unprotected young in a pouch. Where else have we found large running birds like the emu?

FIG. 467.

MAP QUESTIONS. — (1) Judging from the railways and cities, which is the best-settled part of Australia? (2) Which part is least settled? (3) What reasons can you suggest for these facts? (4) From the lakes and rivers, what do you infer concerning the climate of the interior? (5) How does Tasmania compare in area with Pennsylvania? (Appendix.)

With your own state? (6) Make the same comparison for New Zealand. (7) Make a list of the island groups belonging to the United States; to Great Britain; Germany; the Netherlands; France. (8) What nations claim parts of Borneo? New Guinea? (9) Find the area of each of these islands (Appendix) and compare it with the area of your own state.

FIG. 468.

REVIEW AND COMPARISON. — (1) Give several reasons why Africa has been explored and settled so much later than either North or South America. (2) What rivers of North America resemble those of Africa in having rapids and falls that interfere with commerce? (3) Contrast the Mississippi River with the Nile. Make a drawing of each, showing the principal tributaries and towns. (4) Compare the Kongo with the Missouri in length; with the Amazon (Appendix). (5) Compare the area of Lake Victoria Nyanza with that of Lake Superior (Appendix). (6) Is Africa on the whole as well adapted to agriculture as is South America? Give your reasons. (7) Contrast the Victoria Falls with Niagara Falls. (8) What part of America is in the same latitude as the Sahara? Cape Horn is how much farther south than the Cape of Good Hope? (9) Why is not a large part of northern South America a desert, like northern Africa? (10) Compare southern Africa with southern South America in products and importance. Why the difference?

SUGGESTIONS. — (1) What per cent of the present population of the United States belongs to the negro race? (2) How do the negroes compare with the Indians in their willingness and ability to adopt civilized customs? (3) Read the Bible story of Joseph in Egypt. (4) Read the story of Moses. (5) Find out some facts about the Pyramids. (6) Why is England especially benefited by the Suez Canal? (7) Find some facts about Livingstone, Mungo Park, Stanley, and other African explorers. (8) Find out about Krüger and the British war with the Boers in 1900. (9) Why was the southern point of Africa called the Cape of Good Hope?

For REFERENCES, see *Teacher's Book*.

A crocodile on the bank of the Nile.

III. AUSTRALIA AND ISLAND GROUPS

Australia

Physiography. — Australia lies apart from the rest of the world, an island continent in the water hemisphere and the only continent wholly in the southern hemisphere. Isolated for ages, its plants and animals differ (Fig. 466) from those in other parts of the earth. With its area of nearly three million square miles, it approaches the United States or Europe in size. But it has been settled by Europeans so recently, and so much of its surface is desert (Fig. 467), that it is much less densely populated than the other continents. Much of the interior is practically unexplored, partly because of the desert and partly because of the absence of interior navigable waters.

The surface, like that of Ireland, suggests a plate in form, since the low interior rises gradually to plateaus and mountains which often descend steeply toward the sea. While there are some low, short ranges in the interior, the highest land is in the east, where the mountains run parallel to the coast. In the southeast some of the peaks reach a height of over a mile.

The mountains of eastern Australia, like the Appalachians of North America, are the worn-down remains of an ancient mountain system. Still further like the Appalachians, they served to check the extension of early settlements inland. Tasmania is really a continuation of the eastern highland, as Newfoundland is a continuation of the mountains of eastern North America.

The streams which flow eastward to the Pacific, cascade down the mountains in short courses. Of the others in eastern Australia some end in the lakes of interior basins, and some evaporate in the dry climate ; but many unite with the Darling and Murray rivers, which are at times navigable for long distances. During the dry summer season, however, all except the Murray may dwindle to mere chains of water holes. A wave-built bar at the mouth of the Murray closes it to ocean steamers, so that, unlike the Mississippi, no large cities have grown up along its banks.

The coast line of Australia is so regular that there are few good harbors except in the southern part where the land has recently subsided.

Off the northeastern coast is the *Great Barrier Reef*, the longest coral reef in the world. This has been built by coral animals, which still thrive there in great numbers. A few openings allow ships to enter the quiet channel between the reef and the land; but navigation is not easy, and only an experienced pilot can avoid the dangerous shoals.

Climate. — Since Australia lies within the belt of the southeast trade winds, the eastern highland has an abundant rainfall on its seaward side and is clothed with dense forests. After crossing mountains, however, the winds are so dry that the forest gradually disappears, changing first to open, park-like woodlands, then to grass-covered uplands, and finally to desert lowlands, still partly unexplored. The low interior mountain ranges cause only a slight rainfall which supplies the salt lakes of the interior.

FIG. 469.
Eucalyptus forest in Australia.

During the southern winter the interior becomes cold, and the heavy air presses outward toward the coast as cold land winds; but during the summer the dry interior is so intensely heated that monsoon winds blow from the northeast and bring equatorial rain to the northern coasts. In this section are found areas of tropical forest. Southwestern Australia and Tasmania are reached by the prevailing westerlies, with their cyclonic storms, which bring variable weather

and rainfall, as in eastern United States. These rainy sections are also clothed with forests.

It is therefore only along portions of the coast that there is enough rainfall for agriculture, while the interior, and much the greater part of the continent, is either arid or actual desert. Much of the interior is adapted to stock raising, though some parts are too arid for that; but the southeastern coast, with an equable climate which reminds us of the Mediterranean, would support a dense population.

FIG. 470.
Undergrowth in the Australian forest.

Plants. — Australian vegetation is not only peculiar, but also strikingly adapted to the climate of the country. In the interior, as in other desert regions, grass and flowering plants have gained the power to make rapid growth and to mature their seeds quickly, so that a few days after a rain the barren sands become carpeted with green as if by magic.

Among the desert grasses, one of the most remarkable is the porcupine grass which grows on the sandy plains of the northwest interior, and is so hard, wiry, and spiny as to prevent passage through it. Plants with leaves which taste of salt also thrive here, being fitted for growth on plains that are too dry and alkaline for grass. These "salt bushes" are so valuable as forage for sheep and cattle that they are now introduced into the arid section of southwestern United States.

The scrub trees that flourish in the arid interior have developed a foliage able to resist evaporation. In these interior forests, which the settlers call "scrub," the thorny acacia and the close-set stems of gum — rising to a height of a dozen feet — form a thicket through which a lost traveler may wander until death relieves his thirst.

On the rainy slopes near the coast the gum trees grow to a great size, in some cases four hundred feet in height. They rival the redwoods of California, which also thrive where damp winds blow from the ocean. The undergrowth of the forest (Fig. 470), which is almost tropical in character, includes tree ferns, palms, and orchids. These dense woods are called the "bush."

History. — When discovered, Australia was sparsely settled by blacks allied to the negroes of Africa, but differing from them in many respects.

Of these savages it is estimated that about seventy thousand remain, of whom about a third still wander in the wild interior, scantily clad (Fig. 471), building the rudest of shelters, and gaining their living by hunting. They still use that peculiar weapon, the *boomerang*, which, when properly thrown, will fly in curves and even return to the thrower.

Although for a long time it had been known that there was an Australian continent, settlements were not made there until 1788. Neither the country nor the products were tempting to the early Spanish and Dutch explorers, and those nations colonized other lands of greater promise. It was not until the famous English navigator, Captain Cook, led an expedition to this southern continent that the fertile southeastern coast was discovered.

For a time the distant land was used as a regular penal station to relieve the crowded condition of English jails, and naturally free settlers came to the country slowly. But their number gradually increased, and, after long agitation, the transportation of criminals was stopped.

Almost at the same time that gold was discovered in California it was also found in southeastern Australia, and tens of thousands of people rushed there to wash the sands for the precious metal. Since the miners needed supplies, many of the settlers turned their attention to other industries, especially agriculture and grazing. Therefore in Australia, as in California, the gold mines led quickly to the development of the country's resources.

New South Wales, as the first colony was called, finally grew so large, and the settlements were so scattered, that it became difficult to control it under a single government. Consequently Tasmania, Victoria, and Queensland were successively set off as separate colonies. South Australia and West Australia, however, were settled as distinct colonies.

FIG. 471.

Australian savages. The boy has a boomerang in his hand.

The colonies prospered under their popular government, each with its own laws, some having free trade, some imposing tariffs on goods imported from other colonies. Common interests, however, early awakened a desire for union; and finally, on January 1, 1901, they were united to form the *Commonwealth of Australia*. This new commonwealth has a government similar to that of Canada, and is independent of England in all matters except those which affect the British Empire as a whole. The population, which equals that of the United States when her Constitution was adopted, is rapidly growing.

Nearly all the Australian settlers have come from the British Isles, and the unity of the race has led to a peaceful growth. As in England, education has been encouraged, church schools now being replaced by practically free,

compulsory education in public schools. There are colleges at the capitals, and two important universities. The English love of outdoor sports is fully maintained, and great skill is naturally developed in a climate where it is possible to practice cricket, football, tennis, and rowing all the year round.

Sheep Raising. — Although it was gold that brought population to Australia, her greatest wealth lies in her flocks of Merino sheep. Australian wool is the finest in the world. Sheep were first known in Asia, where doubtless they were originally wild animals; and the ancestors of the Merino were such as those tended by Jacob. From Asia the breed spread along the Mediterranean and found in Spain a favorable, dry climate. From this point flocks were taken to the early Dutch colony of South Africa and thence to Australia. The Merino sheep had for centuries been carefully tended in Europe and separated from coarse-wooled varieties; and when it was found that the climate and natural herbage of Australia really improved the quality of their wool, the English demand for that product led to a rapid development of the sheep-raising industry. It has now spread to the newly discovered pastures west of the mountains.

FIG. 472.

Density of population in Australia and neighboring islands.

In the early days of Australia the flocks were reared upon the unfenced government land, as in western United States (p. 161). The sheep were driven to pasture and water, and cared for at night by lonely shepherds, much as in the days of David. But now the land is largely fenced with wire, each sheep station having its own "*run*," or ranch. The largest ranches contain fully a hundred thousand sheep, and employ men enough to make a little village, with a store, a church, and a school. As in Argentina, each run is divided into sections, or "*paddocks*," by wire fencing, so that the sheep of different ages and conditions may be separated. The mildness of the climate makes it unnecessary to provide winter protection for the animals, and now that the wild dogs have been exterminated, the sheep no longer need much care from shepherds.

Animal Products. — To-day grazing is the characteristic and most important occupation in Australia. There are over a hundred million sheep, and fully half the exports consist of wool; but frozen or canned mutton and beef, together with tallow and hides, are also sent to England. Horses are bred for export, and cattle and swine are raised in large numbers. While the sheep graze in the arid interior, cattle are more numerous in the districts where there is heavier rain. Many cattle, especially near the coast, are raised for dairy products, and butter is exported to England. At the season when the cows of Belgium and Denmark are stalled because of the cold, the dairy herds of New South Wales are feeding on fresh pastures. Explain the causes of the difference.

Agriculture. — Since agriculture secures a larger return from the soil than grazing, sheep have been driven from the damp lowlands and from those portions of the plateaus where the rainfall is sufficient for crops. Even in the interior there is farming where irrigation is found possible. In some cases water is supplied from streams; in others, from artesian wells.

Wheat is the most important crop aside from hay, and enough is raised to place Australia twelfth among lands raising this grain.

FIG. 473.

The last Tasmanian, a race now entirely extinct.

The farm products are distributed according to climate. For example, while oats and other hardy grains increase southward to Tasmania — since cold increases in that direction — corn is important only from New South Wales northward. There are large sugar plantations on the warm coast of Queensland; and in western Australia, where there are gold mines in the arid interior, much hay is raised for the animals employed at the mines.

As in our Pacific states, fruits are an important product. They range from tropical varieties on the northern coast to oranges and other warm temperate fruits southward, and finally, in the highlands and in Tasmania, to the orchard and small fruits of the cool temperate lands. In Victoria and South Australia, vineyards for the production of wine are of importance. Some of this fruit raising is carried on by the aid of irrigation, as for instance in the Murray River valley, where the water is supplied by

the melting snows of the mountains. In what months would the snows melt there ?

Mining. — The gold of Australia, like that of California, was first obtained from the gravels, and mines were later opened along the veins in the mountain rocks. Unlike the condition in western United States, however, absence of water has prevented hydraulic mining on a large scale. Gold mining is still of great importance. New deposits are discovered as the country is explored, the recent development of western Australia being largely due to such discoveries.

Copper mining greatly aided in the early development of South Australia, and rich copper mines are now worked in Tasmania. Silver and tin are other important mineral products. Coal is well distributed and of good quality.

Manufacturing. — Some wool is manufactured into cloth; some leather is tanned and made into shoes; and much flour is made from the wheat. There are sawmills and planing mills; and other forms of simple manufacturing are carried on. But for the most part the raw products of Australia are shipped abroad to be manufactured. Most of these products go to England, and the commonwealth depends upon the mother country for most of its manufactured articles. Australia is passing from the pastoral to the agricultural stage of her development, and the stage of extensive manufactures is yet to come.

Cities. — Australian cities have grown very rapidly, and one third of the people live in the capitals of the six colonies. Favored

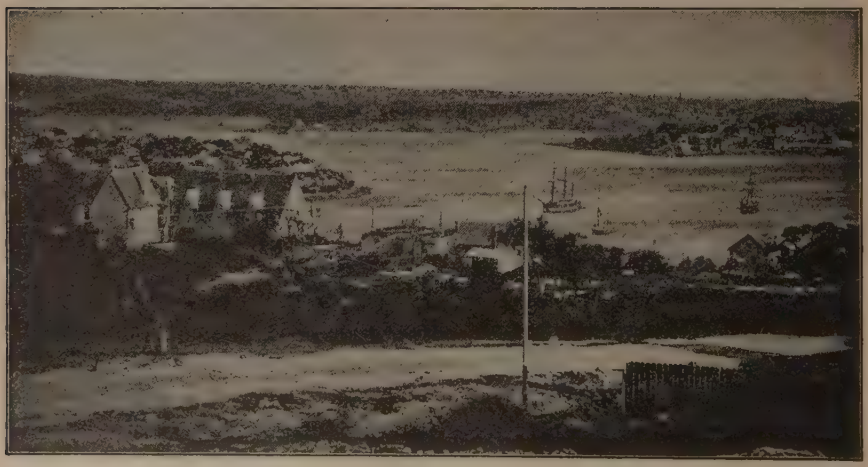


FIG. 474.

Sydney harbor.

as the seats of government and as seaports, and connected with the interior by government railways, these capitals have become the leading commercial centers. They are characterized by fine government buildings and by abundant provision of parks and gardens for the people. Their large suburbs afford homes for the workingmen and save them from the crowded life in tenement houses.

MELBOURNE, the largest city in Australia and the capital of Victoria, is beautifully situated at the head of a broad harbor. SYDNEY, the capital of New South Wales, founded in 1788, and,

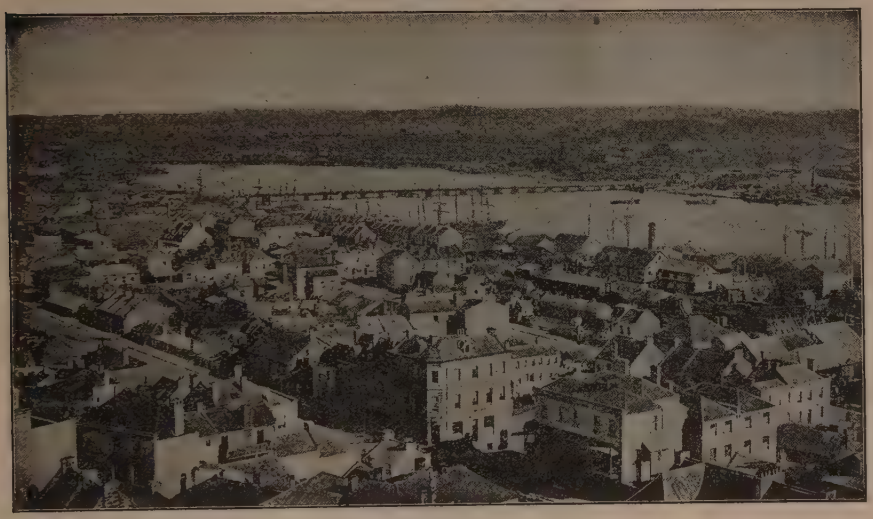


FIG. 475.

A view of a part of Sydney.

therefore, the oldest city of Australia, is noted for its fine harbor (Figs. 474 and 475). Both of these cities rank among the great seaports of the British Empire. ADELAIDE is a third large city. Of which division is it the capital? Name the other capitals.

Since nine tenths of the Australians live on the coast lands, much of the commerce is carried on by means of steamboats, and most of the cities are seaports connected by rail with the interior farms, mines, and sheep country. A few mining centers, like BALLARAT and BENDIGO in Victoria, have become large towns. Ballarat owes its growth partly to its trade as the center of a fine farming and grazing country.

Island Groups

New Zealand. — More than a thousand miles southeast of Australia are the two large, mountainous islands of New Zealand. In the South Island there are great glaciers among the mountains, while in the North Island there are active volcanoes, and also hot springs and geysers, like those of the Yellowstone National Park.

Since these islands lie in the course of the stormy westerlies, there is heavy rainfall on the western slopes. Therefore the moun-

Fig. 476.

A view in New Zealand.

tains are clothed with forests of pine and other trees, with many kinds of ferns and tree-ferns beneath. On the lee or eastern slopes the rainfall is less, and the land is covered with wiry grasses.

In the south the crops are those of the cool temperate belt ; but in the north the climate is mild enough for oranges. Can you suggest how ocean currents may influence the temperature of the north and south ? (Fig. 267.) What effect must the presence of water on all sides have upon the temperature ?

New Zealand is so distant from other lands that few of the larger animals, except birds, have ever reached the islands. The native people, or *Maoris*, who must have come to the islands in boats, were a hardy, warlike race, living in protected villages, amidst cultivated fields. Their opposition to newcomers delayed settlement by the English until a half-century after the founding of Sydney. They are now overpowered, and

those that survive live mostly in the interior of the North Island. Many have so fully adopted civilized ways that they are allowed representatives in the legislature.

As in Australia, pastoral industries take the lead. There are twenty million sheep, and frozen mutton and wool are exported to England. Cattle are likewise kept, and butter is exported. Agriculture is important, especially in the districts of fertile volcanic soils on the North Island; but much land that is suited to farming has never been cleared of forest. There are both gold and coal mines among the mountains; and from their slopes are obtained valuable timber and a gum used for varnishes. Manufacturing is only slightly developed, and is chiefly for home use.

Although the industries and life of this English colony resemble those in Australia, its interests are so different that they have prevented its joining the Australian federation — just as the island colony of Newfoundland has declined to join the Dominion of Canada. The situation of these islands in the temperate zone is favorable to rapid progress; the vigorous immigrants from the British Isles have developed the resources wonderfully, and have established one of the best governments in the world.

Many short lines of railway connect the settled interior with the seaports; roads and stage lines extend to the more distant districts; and steamers ply around the coasts and to distant countries. There are four prominent cities of nearly the same size, the smallest of which is WELLINGTON, the capital, and the largest, AUCKLAND, about as large as Duluth in Minnesota.

The East Indies. — Between Asia and Australia are hundreds of islands, some very large, others so small that they find no place on our map. Of these the great majority have animals, plants, and people of Asiatic origin. New Guinea, however, which is nearest to Australia, bears a resemblance not to Asia but to Australia. It is, therefore, usually considered a part of Australasia, while the islands to the west and northwest are classed with Asia.

New Guinea, north of Australia, is one of the largest islands in the world, having an area equal to Texas and Pennsylvania combined. Although three times the size of New Zealand, it contains a smaller population, composed mainly of savages (Figs. 477 and 478). This difference is due to its position in the torrid zone. The heavy tropical rainfall has clothed most of its surface with dense forests, so that the high mountain ranges and the unhealthful lowlands of the interior are almost unknown.

While the islands farther west are overrun with Malays from Asia, the natives of New Guinea resemble the native Australians. The animal life

also resembles that of Australia, a fact indicating that this island, like Australia, has long been separated from Asia. Former connection with Australia is further indicated by the fact that the two are now separated only by a shallow sea.

The East Indies proper also have a tropical climate, and are clothed with dense forests in which the elephant and rhinoceros, as well as other Asiatic animals, are still found. Most of the natives are Mohammedan Malays from Asia, but some of them are pagans.

FIG. 477.
Houses in the trees in New Guinea.

The *Philippine Islands*, which belong to the United States, are really a northern extension of the East Indies. What can you tell about them?

Many of the other islands of this region, including Sumatra, Java, the Celebes, and a large part of Borneo and New Guinea, are *Dutch colonies*. What nation controls the island of Timor? To which nation does northern Borneo belong? Borneo, with a greater area than all the New England and Middle Atlantic states together, is one of the largest islands in the world. The immense size of these islands is indicated by the fact that Sumatra is larger than California, while Java has a greater area than New York State.

All of the larger islands are mountainous; in fact, they are parts of mountain ranges rising out of the sea, and among them are many active volcanoes, some of which have had terribly destructive eruptions. There are lowlands near the coasts, and many coral reefs skirting them. Indeed, a large number of the smaller islands are merely coral reefs slightly elevated above the ocean.

Since they are so near the equator, and therefore have a heavy rainfall, these islands have tropical products. The forests supply valuable woods and gums, including gutta-percha and camphor. Large areas,

especially in Java, are highly cultivated and produce quantities of rice, sugar cane, and coffee. In the production of the last two articles Java

FIG. 478.

A New Guinea village built in the water for protection against enemies.

is one of the most important regions of the world (Fig. 507). Among the noted products of the East Indies are spices, such as pepper, cloves, and nutmegs; in fact, one of the island groups is known as the Spice Islands. What is the other name? There are also valuable minerals, including tin, gold, and precious stones.

The Dutch have been remarkably successful in managing their East Indian colonies, which are a source of great wealth; yet the larger islands are so mountainous and the forests so dense, that great areas are scarcely known. The Dutch East Indies are fifty times as large as the Netherlands and have seven times as many inhabitants, or nearly half as many as the United States.

FIG. 479.

A native house in the Friendly (Tonga) Islands.

The largest city among these islands is MANILA, in the Philippines; the next in size is BATAVIA, the center of the Dutch colonial government.

Islands of the Pacific. — The map (Fig. 403) shows the western Pacific dotted with island groups; but these islands are so small that, although there are many hundreds of them, their combined areas are little more than half that of New Zealand. They are the higher peaks of great mountain folds rising from the ocean floor. Many of them are volcanoes, others submerged peaks upon which corals have grown and formed coral islands.

Although missionaries have converted many of the inhabitants to Christianity, others remain savages, and some practice cannibalism.

There is a marked difference between life on the "low," or coral, and that on the "high," or volcanic, islands. Volcanic islands, like Fiji, the peaks of which rise several thousand feet, are heavily forested on their

FIG. 480.

A native village in the Fiji Islands.

rainy, windward slopes; and their fertile soil encourages agriculture. Thus the coffee plantations of New Caledonia and the sugar plantations of Fiji recall the products of the volcanic Hawaiian Islands. As in Hawaii, also, bananas and pineapples are raised for home consumption and for export.

On the low coral islands, on the other hand, the cocoa palm is the mainstay of human life, supplying food, clothing, shelter, boats, many utensils, and the means of trade as well. *Copra*, the main export from Samoa and from many of the Pacific islands, is the dried meat of the cocoanut, of value for its oil and as food.

REVIEW QUESTIONS. — *Australia.* (1) What about its position, area, and population? (2) Where are the mountains? (3) What resemblance is there to North America? (4) How do the streams vary in the several sections? (5) What is the nature of the coast? (6) Tell about the Great Barrier Reef. (7) How does the rainfall vary in the different parts of Australia? Give the reasons. (8) What differences in plant life are thus caused? (9) What is the influence on industries? (10) Mention some of the ways in which the plants are adapted to their surroundings. (11) Tell about the forests. (12) Tell about the natives. (13) Give reasons why Australia was not settled earlier. (14) What finally led to rapid settlement and development? (15) Tell about the government. (16) Tell about sheep raising: the Merino sheep; introduction to Australia; development of the industry; care of the sheep. (17) What are the animal products? (18) Tell about farming: water for irrigation; principal products; variation in crops according to climate. (19) What mineral products are found? (20) What is the condition of manufacturing? (21) Why are the capitals so important? (22) Name and locate the three largest cities; what can you tell about each? (23) What about other towns?

Island Groups. (24) Tell about New Zealand: its surface features; climate; native animals and people; leading industries; development; cities. (25) Tell about New Guinea: size; position; climate; people; animals; resemblance to Australia; resources. (26) What about the animals, plants, and people of the East Indies? (27) To what nations do the islands belong? (28) What about their size? (29) Tell about their physiography, climate, and products. (30) What about the success of the Dutch in the East Indies and the extent of their possessions there? (31) Tell about the small island groups: their names; position; origin; government; people; products.

COMPARISONS. — (1) Australia resembles South Africa in its surface, climate, occupations, and products. State how this is true. (2) Australia also resembles western United States in climate, in occupation and products, and in the order of development of her resources. Describe these points of resemblance. (3) In what respects does southern South America (Chile and Argentina) resemble Australia? (4) What differences are there in climate due to difference in form of the two land masses? (5) What differences in the present condition of development, due to the history and the races of each? (6) What part of Australia has the same latitude, in the southern hemisphere, that southern Florida has in the northern? (7) Which of our states most nearly equals New Zealand in area? (8) What peninsula of Europe resembles New Zealand in shape? How do the two countries compare in area? In population? (9) What advantages over Australia has the United States enjoyed in that it has attracted settlers from so many different nations? (10) What part of South America most resembles the East Indies in climate and products? Make the same comparison for North America.

SUGGESTIONS. — (1) If it were within your power, how would you arrange the highlands of Australia so as to secure the most even distribution of rain? (2) Estimate the greatest length of New Zealand. (3) Estimate the distance from Batavia to Manila. (4) Write your impression of the climate of Melbourne in January; in July. (5) Through some fruit dealer obtain a cocoanut in its husks and examine it. (6) Read Whittier's poem on the Palm Tree. (7) Learn something about the work of missionaries in the small Pacific islands. (8) Collect pictures for the school, showing the islands and their life. (9) By what routes can one go from New York City to Australia? Through what waters? Which

would be the shortest? About how many miles? (10) Answer the same questions for a voyage from New York to Manila. (11) Read in Tarr's "Elementary Geology" (pp. 251–256) about the origin of atolls. (12) Read about the eruption of Krakatoa (same book, p. 343) in the Sunda Strait, near Batavia.

For REFERENCES, see *Teacher's Book*.

FIG. FF.

A Native Kanaka Girl in Holiday Dress, Hawaiian Islands.

THE UNITED STATES COMPARED WITH OTHER COUNTRIES

Area and Population. — In spite of the vast extent of the United States, there are three empires in the Old World with a greater

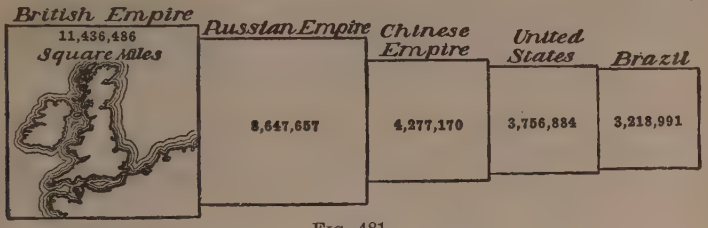


FIG. 481.

Area of the five largest nations.

area. Which are they? (Fig. 481.) Which country is fifth in size? Compare the United States with each of these in area.

The United States also ranks fourth in *population* (Fig. 483). Name the five most populous countries in the order of their rank. What facts do you discover by comparing Figures 481 and 482? Figure 482 shows the *density of population*, or the number of people per square mile, in some of the countries in the world. From this it will be seen that the United States is very thinly settled, compared with many countries. Compare the United States in this regard with Belgium, England, Cuba, Mexico, and Canada.

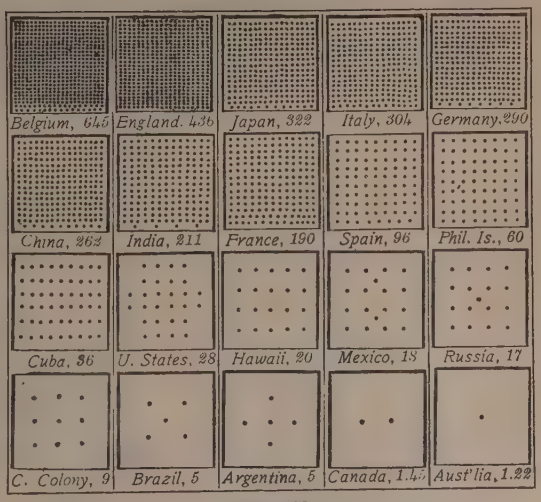


FIG. 482.

Density of population of some of the countries.

Leading Raw Products. — Nevertheless, the United States leads the world in many very important respects and approaches leadership in

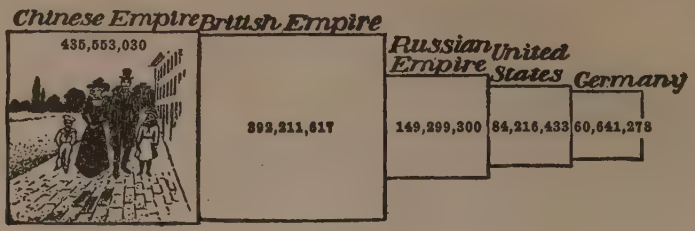


FIG. 483.

The five most populous nations, 1906.

several others. Figure 484 shows that no nation is a close rival to us in the production of *corn*. What countries, however, raise large quantities of it? Why is no corn raised in the British Isles? (p. 329.)

FIG. 484.

Sketch map to show the approximate distribution of corn.

Wheat is more widely cultivated than corn (Fig. 485). Yet we are far in the lead in that grain (Fig. 486). Point out (Fig. 485) the leading wheat fields of the world. Which sections are important

FIG. 485.

Approximate distribution of wheat.

for both wheat and corn? On which side of the Atlantic is wheat raised farthest north? Why?

Cotton is limited to warm climates (Fig. 487), so that compara-

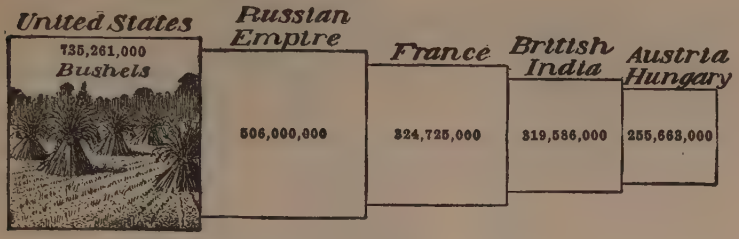


FIG. 486.

The five leading wheat-producing countries, 1906.

tively few countries raise it. Name the five that lead in its production (Fig. 488). To what extent does the output of the United States surpass that of the four other countries together? In what parts

FIG. 487.

Approximate distribution of cotton.

of the United States is most *cotton manufacturing* carried on? What other countries have important cotton-manufacturing industries?

Note the distribution of *sheep and cattle* (Fig. 489). What is our rank in the production of *wool?* (Fig. 490.) Yet we consume much more than we raise. Recall some facts concerning sheep raising in Australia, Argentina, and the United States. What nations have important *woolen manufacturing?*

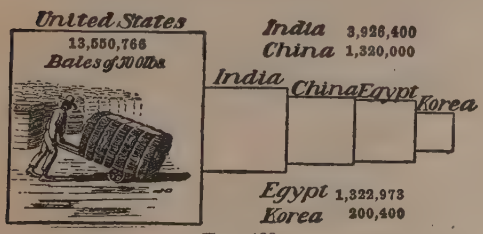


FIG. 488.

The five leading cotton-producing countries, 1907.

The extreme importance of *coal and iron for manufacturing* purposes has often

been emphasized. But Figure 491 represents the *coal fields* as very limited. What countries have little or none? Name the leading

FIG. 489.

Approximate distribution of sheep.

coal-producing sections, and state the rank of the United States in this mineral (Fig. 492).

Is *iron ore* more or less widely distributed than coal? (Fig. 493.)

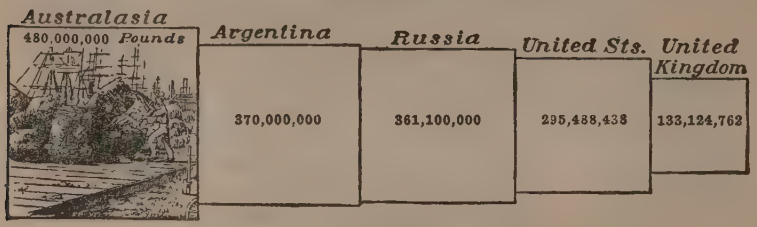


FIG. 490.

The five leading wool-producing countries, 1904–5.

How does the United States rank in the output of this mineral (Fig. 493); also in the production of *pig iron* (Fig. 494), which demands

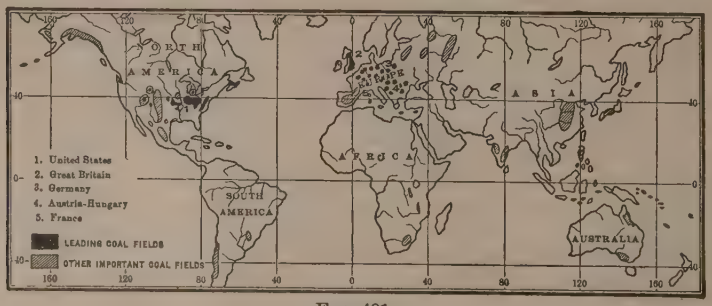


FIG. 491.

Approximate distribution of coal.

coal as well as iron ore? How does the output of coal and iron correspond to the importance of countries as manufacturing nations? (Fig. 500.)

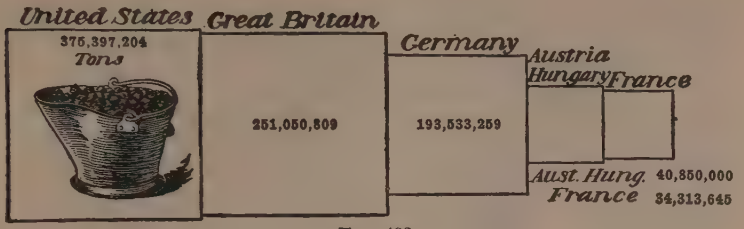


FIG. 492.

The five leading coal-producing countries, 1906.

Where are the principal *silver*-mining sections? (Fig. 495.) And how do we compare with other countries in this product? (Fig. 496.)

FIG. 493.

Approximate distribution of iron mines.

Notice to what extent the world is indebted to the New World for silver. Tell about the distribution of *gold* (Fig. 497), and give our

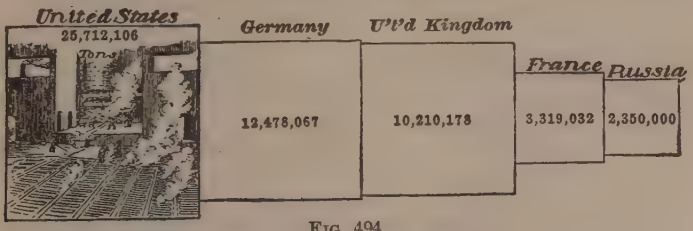


FIG. 494.

The five leading countries in the production of pig iron, 1906.

rank in the production of that metal (Fig. 498). How does the value of the total gold production compare with that of silver in the five leading regions for each?

The United States leads the world in the production of *petroleum*, or mineral oil, the second most important district being in Russia near the Caspian Sea. Other districts produce little petroleum.

FIG. 495.

Approximate distribution of silver mining.

Manufacturing and Commerce. — According to Figure 499, on what two continents is there the greatest development of *manufacturing?*

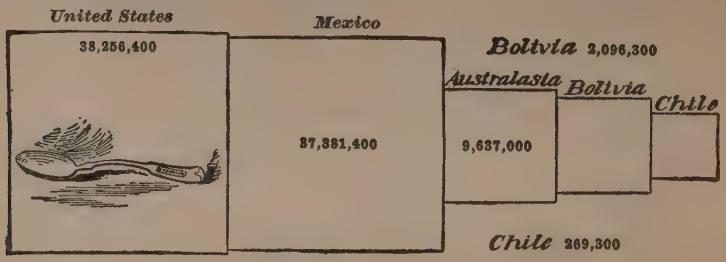


FIG. 496.

The five leading silver-producing countries, 1906.

What other smaller sections are active in this industry? Considering the abundance of our raw materials and the energy and intelli-

FIG. 497.

Approximate distribution of gold mining.

gence of our people, it is not surprising that we surpass all other countries in such work (Fig. 500). State the rank of other leading nations in this occupation.

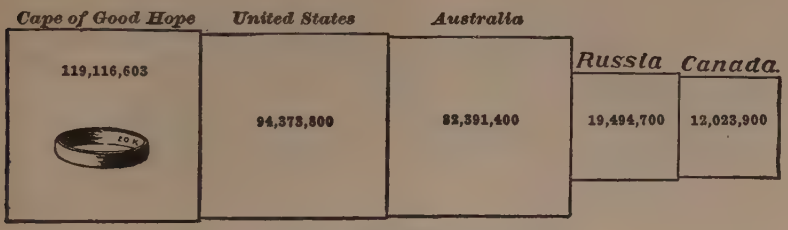


FIG. 498.

The five leading gold-producing countries, 1906.

In provision for *transportation by rail* the United States also takes the leading place. It has by far the greatest number of miles of railway of any nation (Fig. 501), though several small European

FIG. 499.

Approximate distribution of manufacturing.

countries have a greater development of railways in proportion to their area. The United States ranks second in provision for

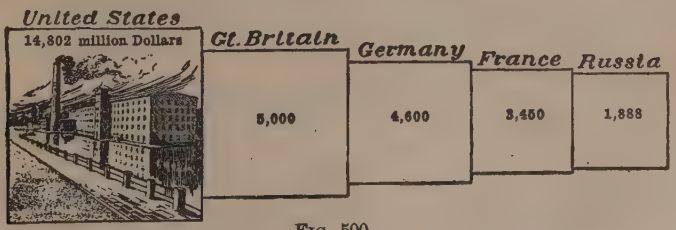


FIG. 500.

The five leading manufacturing countries, 1900.

transportation by water (Fig. 502). State the rank of the five chief countries in total length of *railways*, and in *merchant marine*.

Give reasons why the United Kingdom should lead in merchant marine (p. 343). Why should Norway be of importance in this respect? (p. 376.) All these facts prepare us for Figure 503, which shows that the United States is the *wealthiest nation* on the face of the earth. Compare our wealth with that of other leading countries. In how many and in what respects have our products and industries been shown to lead all nations of the world?

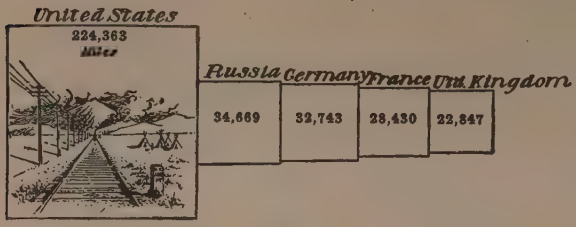


FIG. 501.

The five countries having the greatest length of railways, 1906.

Dependence upon Other Nations. — Altogether the United States may be considered a wonderfully favored and independent nation, since it has such a wealth of raw products, and such an extensive development of manufacturing. We, probably, better than any other nation, could depend upon ourselves alone for all that we need, if occasion should arise. Yet so closely related are the nations of the world that, if war arises between two of them, our industries and markets are affected. This is due largely to the fact that we produce far more than we need of certain commodities, as wheat, cotton, meat, and iron, for which a

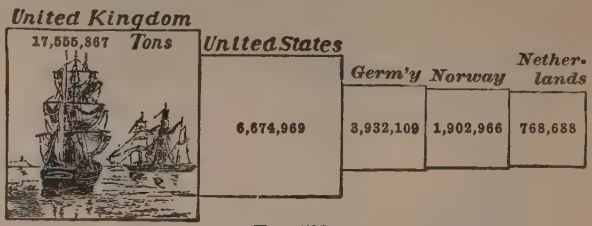


FIG. 502.

The five countries having the largest merchant marine, 1906.[1]

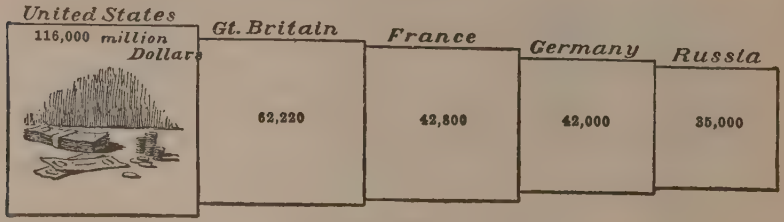


FIG. 503.

The five wealthiest nations, 1907.

[1] Tonnage of United States in 1907, 6,938,794.

market must be found abroad. These we *export*. But it is also due to the fact that we are partly or wholly dependent upon foreign countries for certain other articles. These we *import*.

For example, Figure 504 shows that *coffee* is not grown within our states, although it is daily consumed in almost every household.

FIG. 504.

Approximate distribution of coffee.

Notice, however, that it is produced in Cuba, Porto Rico, and the Philippine Islands (Fig. 504). To what climate and countries is it confined? State the rank of the principal coffee-producing sections and compare their output (Fig. 505).

Note the *beet sugar* and *cane sugar* areas (Fig. 506). What difference do you detect in the situation of the countries producing these two kinds of sugar? Also note the rank of the leading countries which manufacture cane sugar (Fig. 507). Our own states produce far less sugar each year than we consume. Of what importance, therefore, in this respect is our newly established relation to Cuba and the Hawaiian and Philippine Islands?

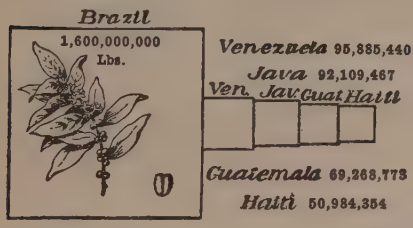


FIG. 505.

Exports from the five leading coffee-producing sections, 1906.

We depend wholly on foreign nations for raw *silk*. Name the chief silk-producing countries (Fig. 508). What have you learned about the production of silk? Our *tea* also comes almost entirely from abroad, mainly from eastern and southern Asia. From what region mainly? And while much *rice* is produced in our Southern States (Fig. 509), a large amount has to be imported. From what sources must it be obtained? We have, therefore, a very extensive trade in *imports* as well as in *exports*.

Exports and Imports. — Our ten leading exports, named in order of value, together with the principal countries to which the goods are sent, are as follows: —

Articles	Value in 1907	Principal Countries to which they are sent
1. Cotton (mainly unmanufactured)	$513,582,209	Gt. Britain, Germany, France, Japan.
2. Breadstuffs (wheat, corn, flour, etc.)	168,322,502	Gt. Britain, Germany, Netherlands, Belgium.
3. Meat and dairy products	102,392,508	Gt. Britain, Germany, France, Belgium.
4. Iron and steel, and manufactures of	181,530,871	Gt. Britain, Canada, Germany, Mexico.
5. Mineral oils	84,855,715	Gt. Britain, Germany, Netherlands, Belgium.
6. Copper (mainly manufactures of)	96,600,698	Gt. Britain, Netherlands, France, Germany.
7. Wood, and manufactures of	83,349,575	Gt. Britain, Canada, Germany, W. Indies.
8. Animals (mainly cattle)	41,203,080	Gt. Britain.
9. Tobacco	39,113,011	Gt. Britain, Germany, Italy, France.
10. Leather, and manufactures of	45,476,969	Gt. Britain, Australasia, Canada.
Total value of exports	$1,988,989,337	

The ten leading imports, on the other hand, are as follows: —

Articles	Value in 1907	Principal Countries from which they come
1. Sugar and molasses	$92,806,253	E. Indies, Hawaiian Isds., Cuba, Germany (beet sugar).
2. Silk, and manufactures of	110,065,150	Japan, France, China, Italy.
3. Hides and skins	83,206,545	E. Indies, S. America, Gt. Britain, France.
4. Fiber, and manufactures of	109,661,816	Mexico, Philippines, E. Indies.
5. Chemicals, drugs, etc.	82,997,914	Germany, E. Indies, Gt. Britain.
6. Coffee	78,231,902	Brazil, Cent. America, E. Indies, Mexico.
7. Cotton (mainly manufactures of)	93,635,265	Gt. Britain, Germany, Switzerland, France.
8. Wool, and manufactures of	63,855,626	Gt. Britain, Germany, France, S. America.
9. Rubber and rubber goods	70,206,418	Brazil, Gt. Britain.
10. Fruits and nuts	35,807,527	Italy, Cent. America, W. Indies.
Total value of imports	$1,391,878,298	

In Figure 510 trace the main *steamship lines* of the world by which these goods are carried. Compare the value and nature of our exports and imports. How is the result encouraging?

More than one-third of all our foreign trade is with the British Isles, the ten leading countries ranking as follows: —

THE TEN LEADING COUNTRIES WITH WHICH WE TRADE

Countries	Value in 1907	Kinds of Goods
1. British Isles	Exp. $607,783,255 Imp. 246,112,047 Total 853,895,302	Provisions, breadstuffs, raw cotton. Cotton goods, raw wool, tin, jewelry, rubber goods.

FIG. 506.

Distribution of sugar cane and beet sugar.

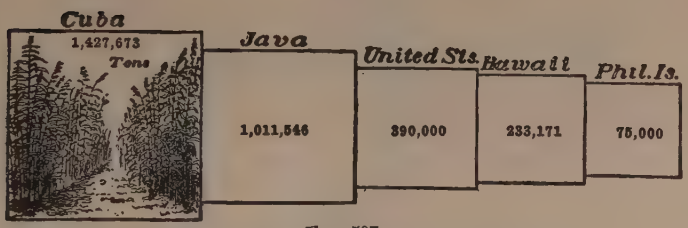


FIG. 507.

The five countries producing most cane sugar, 1906–7.

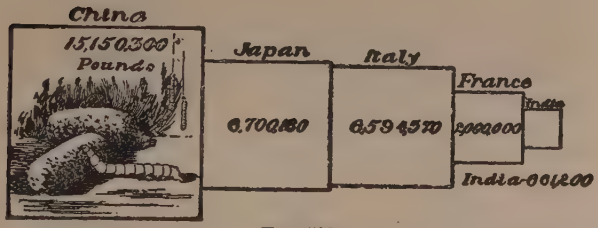


FIG. 508.

The five leading raw-silk-producing countries, 1899.

FIG. 509.

Approximate distribution of rice.

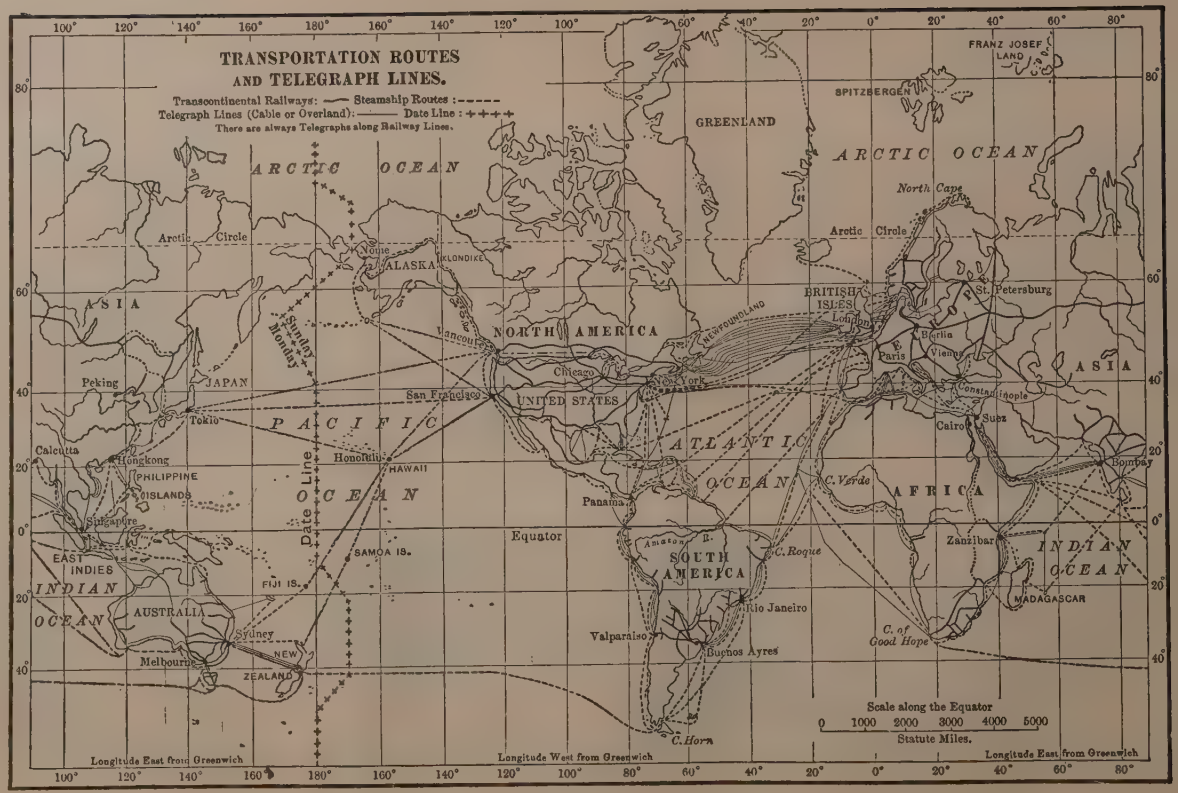

TRANSPORTATION ROUTES
AND TELEGRAPH LINES.
Transcontinental Railways: —— Steamship Routes :- - - - -
Telegraph Lines (Cable or Overland): —— Date Line : + + + +
There are always Telegraphs along Railway Lines.
ARCTIC OCEAN
GREENLAND
FRANZ JOSEF LAND
SPITZBERGEN
North Cape
Arctic Circle
Nome
ALASKA
KLONDIKE
ASIA
Siberian Railway
Skagway
Monday
Vancouver
NORTH AMERICA
NEWFOUNDLAND
BRITISH ISLES
London
St. Petersburg
Berlin
Vienna
Paris
Chicago
New York
Peking
JAPAN
San Francisco
UNITED STATES
Constantinople
Cairo
Suez
Tokio
PACIFIC
OCEAN
ATLANTIC
OCEAN
Calcutta
Hongkong
PHILIPPINE
ISLANDS
Honolulu
HAWAII
Date Line
Bombay
C. Verde
AFRICA
Panama
Singapore
Equator
Amazon R.
SOUTH AMERICA
C. Roque
Zanzibar
INDIAN
OCEAN
EAST
INDIES
SAMOA IS.
FIJI IS.
Rio Janeiro
MADAGASCAR
AUSTRALIA
Sydney
Valparaiso
C. of
Good Hope
Melbourne
NEW
ZEALAND
Buenos Ayres
C. Horn
Scale along the Equator
0 1000 2000 3000 4000 5000
Statute Miles.
Longitude East from Greenwich
Longitude West from Greenwich
Longitude East from Greenwich

FIG. 510.

Countries	Value in 1907		Kinds of Goods
2. Germany	Exp.	$256,653,060	Raw cotton, breadstuffs, provisions.
	Imp.	161,544,552	Beet sugar, chemicals and drugs, cotton goods, silk goods.
	Total	418,197,612	
3. France	Exp.	23,384,989	Raw cotton, copper, mineral oil.
	Imp.	1,125,945	Silk goods, hides, jewelry, cotton goods.
	Total	24,510,934	
4. Canada	Exp.	97,807	Coal, breadstuffs, cotton and manufactures of.
	Imp.	175,862	Lumber, coal, hides.
	Total	273,669	
5. Netherlands	Exp.	104,450,319	Breadstuffs, provisions, copper, mineral oil.
	Imp.	32,454,616	Jewelry, tin.
	Total	136,904,935	
6. West Indies	Exp.	68,397,077	Provisions, breadstuffs, animals.
	Imp.	115,117,064	Sugar, fruits, cocoa.
	Total	183,514,141	
7. East Indies	Exp.	11,394,628	Mineral oil, cotton goods.
	Imp.	95,220,808	Sugar, hides, tin.
	Total	106,615,436	
8. Brazil	Exp.	18,697,547	Breadstuffs, mineral oil, provisions.
	Imp.	97,881,158	Coffee, rubber, sugar.
	Total	116,578,705	
9. Mexico	Exp.	66,248,098	Coal, cotton goods, iron and steel manufactures.
	Imp.	57,233,416	Sisal grass, coffee, lead, hides.
	Total	123,481,514	
10. Japan	Exp.	38,770,060	Manufactured cotton, mineral oil, iron and steel manufactures.
	Imp.	68,910,594	Silk, tea.
	Total	107,680,654	

Name some of the countries which probably have the same exports as the United States, and which are, therefore, likely to be active rivals to us in supplying foreign markets.

Owing to our trade relations with the United Kingdom, what hardships would probably be brought upon the British if they entered upon a war with us? How might the Germans suffer if they were at war with us? How might the French suffer? On the other hand, what hardships would come to us in each case? Are we more or less independent than these countries in case of war? Why?

Reasons for the Rank of the United States. — The preceding figures and diagrams show that several European countries are the chief competitors with the United States in the *world's trade*. Give examples. But so far as the future is concerned, several important facts are in our favor. In the first place, we are still in our youth as a people, while some of the leading nations of Europe have perhaps already reached the zenith of their power. In the second place, the territory of most of those countries is densely populated, as shown in Figure 482. Note the number of inhabitants per square mile in Belgium, Germany, and France. When we contrast with these figures our average of only twenty-eight persons per square mile, the possibility of our future growth seems almost without limit. Immense tracts of land, which in Europe would be carefully tilled,

THE WORLD
ON MERCATOR'S PROJECTION
Scale of Miles along the Equator
0 1000 2000 3000 4000 5000
Longitude East from Greenwich
Longitude West from Greenwich
Longitude East from Greenwich
C. Chelyuskin
ARCTIC OCEAN
Greenland
FRANZ JOSEF LAND
SPITZBERGEN
NOVA ZEMBLA
North Cape
ARCT. CIRCLE
East Cape
Prince of Wales
ALASKA
Davis Strait
ICELAND
St. Petersburg
ASIA
Bering Sea
Hudson Bay
C. Farewell
BRITISH ISLES
North Sea
EUROPE
DOMINION OF CANADA
NORTH AMERICA
London
Berlin
Paris
Victoria
Ottawa
NEWFOUNDLAND
Halifax
Chicago
New York
PYRENEES
Mediterranean Sea
Caspian Sea
Himalaya Mts.
JAPAN
Tokio
San Francisco
UNITED STATES
Washington
Gibraltar
Alps
Alexandria
Cairo
Calcutta
Hongkong
TROPIC OF CANCER
PACIFIC OCEAN
ATLANTIC OCEAN
CUBA
PORTO RICO
HAWAIIAN ISLANDS
PHILIPPINE ISLANDS
Manila
GUAM
C. Verde
AFRICA
Arabian Sea
Bay of Bengal
Singapore
EQUATOR
EAST INDIA IS.
SAMOA
FIJI
INDIAN OCEAN
OCEANICA
C. St. Roque
SOUTH AMERICA
INDIAN OCEAN
TROPIC OF CAPRICORN
AUSTRALIA
Rio de Janeiro
Johannesburg
Cape Town
Cape of Good Hope
Sydney
Melbourne
Buenos Aires
NEW ZEALAND
Andes Mts.
Cape Horn
L.L. POATES ENGRG CO., N.Y.

FIG. 511.

THE TWO HEMISPHERES.

FIG. 512.

are in our country not even cleared for pasture; and in no large section of the United States do we even approach the careful hand tillage of Belgium and some other European countries.

Another point in our favor is the varied climate and physiography of our vast country, encouraging varied products. Almost all farm products can be easily raised, and our wonderful mineral resources are apparently not equalled on any continent. It will therefore be seen that our natural resources, which have made present development possible, promise equally well for the future.

Our people are another element to be considered in reckoning past success and future promise. They have consisted, in large part, of those who had energy and ambition enough to migrate to a new land in the hope of bettering their condition. In their new home the possibilities have been so great that they have been encouraged to work and to improve themselves. As the environment of the desert has given rise to the nomad, and the ease of life in the tropical forest to the degenerate savage, so the environment in the United States has given rise to a race noted for its energy and enterprise. This race has been possible, however, largely by reason of the fact that it comes from a mixture of peoples already gifted. That resources alone will not make an energetic people and a great nation is well illustrated in China, where nature favors, but racial characteristics and customs are opposed to, development.

Nor would the statement of reasons for the present position of the United States and her future prospects be complete if left here. There are two other elements of high importance; namely, education and government. Where people are hampered by ignorance, petty restrictions, and heavy taxes, unnecessarily imposed upon them by their rulers, they have little opportunity for progress. It is those European countries in which there are the best opportunities for education and the greatest freedom, that have made the greatest progress. And no nation in the world pays more attention to education, or guarantees its people a more active part in their entire government, than the United States.

INDEX AND PRONOUNCING VOCABULARY

KEY TO PRONUNCIATION

a, as in *fat*; *ā*, as in *fate*; *ä*, as in *far*; *a̤*, as in *fall*; *ȧ*, as in *last*; *ă*, as in *care*; *å*, as in *senate*; *e*, as in *pen*; *ē*, as in *mete*; *e̤*, as in *her*; *ė̄*, as in *event*; *i*, as in *pin*; *ī*, as in *pine*; *o*, as in *not*; *ō*, as in *note*; *ô*, as in *for*; *u*, as in *tub*; *ū*, as in *mute*; *û*, as in *furl*; *u̇*, as in *pull*; *o͞o*, as in *food*; *o͝o*, as in *foot*; *oi*, as in *oil*; *ow*, as in *cow*; *g*, as in *get*; *ġ*, as in *gem*; *c*, as in *cat*; *ç*, as in *cent*; *n̰*, as in *bank*; *s̱*, as in *wise*.

A, e, i, o, and u marked thus: *a̱*, *e̱*, *i̱*, *o̱*, *u̱*, indicate a sound obscured or slurred.

The sign ′ tells upon which syllable the accent is placed. The numbers refer to pages in the book, except where Fig. is before them, when they refer to figures in the book.

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Squabs by the million—waiting to go into pie.
A sight near Los Angeles.

Vernal Falls, Yosemite Valley.

The Merced River at this point is eighty feet wide and drops vertically three hundred and fifty feet.

CALIFORNIA

"HOW SHE SITS LIKE A QUEEN BESIDE
THE BEAUTIFUL SUNSET SEA"

FIG. 513.
State Capitol, Sacramento.

A SUPPLEMENT

BY THE

STATE TEXT-BOOK COMMITTEE

WITH THE COUNSEL AND ASSISTANCE OF

ALLISON WARE, R. E. HOLWAY, JOB WOOD, JR., MARY E. GEORGE,
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FIG. 514.

The United States Atlantic Fleet about to enter San Francisco Bay through the "Golden Gate," May 6, 1908. The view from which this cut was made was taken from the bridge of Admiral Evans' Flagship. "U. S. Battleship Connecticut."

ASIDE TO THE TEACHER

You will find this little Supplement a very inadequate thing. The reason is not hard to find. It is impossible within the limits of so few pages to give an adequate treatment of a state so large, so varied, so wonderful, as California.

So do not get it into your head for a moment that what is here set down is all your young people need to know of their home land, or that your work is done when you have taught this and nothing more.

This will serve, perhaps, as an introduction; as a skeleton for your work. But if you cannot follow up the introduction by many an entertaining conversation, cannot build upon and round out the skeleton by stories and pictures and poems and experiences galore, your work will be poor indeed. Make of it a *pleasant* thing; pleasant for you and delightful for the children. Surely our ideas about our home state should have pleasant and delightful associations. When you can't feel that way, postpone California and give a lesson on the multiplication table instead.

It is an easy thing to teach children to make an outline map of California in half a minute. Do this. Then in subsequent work, a hundred times and more, have the children spend a minute in drawing the outline and locating upon it the interesting things you are thinking about. It clarifies their ideas and gives them a habit of definite thought. Fill yourself full of California, by reading, by conversation, by travel, so that you will have something to teach, and then teach it with delight and enthusiasm, else the children will be immune. Many famous people have written of California, — John Muir, Bret Harte, Mark Twain, Mary Austin, Helen Hunt Jackson,[1] R. H. Dana, Clarence King, Jack London, Robert Louis Stevenson, — history, novel, poem, magazine, newspaper, abound in California lore. Make some of it yours. Keep your eyes open. So order your life that gladly you can learn and gladly teach. Then everything will come out all right.

EDWARD HYATT.

[1] Fig. 515.

NOTE TO THE TEACHER

After going over this Supplement, it will be found that many important interests and localities have been treated slightly, or perhaps not even touched at all. This is unavoidable in covering such a large and varied subject in so few pages. Let no one waste time or energy in pointing out omissions or weaknesses; rather, let the teacher use common sense and enterprise in getting together supplemental material for rounding out and strengthening the bare bones of the outline wherever necessary.

DRAWING MAP OF CALIFORNIA

Probably the teacher has a plan of her own for drawing an outline map of California quickly and simply. If not, here is a simple way:—

(1) Draw a horizontal line AB, of any length, suitable to the space to be filled. Probably you will not use these letters with the children, but only in seeing the plan yourself.

(2) From B let fall a perpendicular to C, as long as AB.

(3) Imagine the line AC and extend it in the same direction to D, making CD about twice as long as AB.

(4) From D draw the Colorado River southward, about two thirds as long as AB (to E).

(5) From E draw a horizontal westward, about two thirds as long as AB, to F.

(6) From A to F draw the crooked coast line, approximately parallel to the eastern line of the state, BCE.

(7) Put in Lake Tahoe at the elbow C; San Francisco Bay nearly opposite, on the coast; put in the Sierras and Coast Range by single broad strokes of pencil or crayon; and then the two great rivers; when behold! there is California, in a minute and less. Practice on this in concert until it is fixed in the minds of the children, and until you see how much the time can be reduced. It will be *fun*, if you manage it right and don't overdo it. It puts something definite in the mind to build your later work upon.

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NOTES AND LISTS OF REFERENCES

FOR USE IN STUDYING THE GEOGRAPHY OF CALIFORNIA

THE geography lesson must be alive with a reality and a crisp freshness such as no scanty text treatment can supply. It must have the wealth of detail, the vividness of outline, that supplementary material alone can bring. Pictures, chalk diagrams and sketches, specimens, curios, stories, poems, and *supplementary reading* are of the essence of success in geography teaching. If your school is poor in such illustrative matter, enrich it. If it is still poor, be rich your self. A few dollars' worth of books; some pictures cut from railroad circulars, board of trade pamphlets, magazine advertisements and catalogs; a handful of specimens of our common rocks — granite, basalt, sandstone, quartz; specimens showing commercial processes; occasional sketch maps and diagrams upon the blackboard; a few simple models, *e.g.* Chinese rocker, oil derrick, snowshed, drying trays, — preferably made by your pupils; a fund of stories, experiences, and anecdotes; a few poems of Bret Harte and Joaquin Miller; and fresh supplementary reading for your class, or, at any rate, for yourself: these properly sprinkled through the work will make each lesson a rich, living experience to your pupils, — and to you.

The following books are suggested as of first value to your school library for use by the pupils. If enough of them are not there to keep the work fresh, and if you cannot secure them through your school board, get a few of them to start with for your own library, as part of your teacher's outfit. Then add others as necessity demands and permits. It will prove as good an interest-bearing investment as you ever made.

Carpenter: Geography Readers. 6 vols., each 60 cents. American Book Co.

Companion Series: 7 vols., each 50 cents. Perry Mason Co.

Herbertson: Descriptive Geography from Original Sources. 6 vols., each 75 cents. Macmillan.

George: Library of Travel Series. 10 vols., each 50 cents. Flanagan.

King: Picturesque Geography Readers. 5 vols. (Home and School, 50 cents; This Continent of Ours, 3 vols., each 56 cents; Northern Europe, 56 cents.) Lee.

Youth's Companion Series: 7 vols., each 25 cents. Ginn & Co.

World and its People: 10 vols. (Our Own Country, 50 cents; American Neighbors, 60 cents; Modern Europe, 60 cents; Asia, 60 cents; Africa, 60 cents; Australia and the Islands of the Sea, 68 cents; Hawaii and its People, 68 cents; South America, 60 cents; Philippines, 60 cents; Porto Rico, 60 cents.) Silver, Burdett & Co.

Ballou: Footprints of Travel. 80 cents. Ginn & Co.

Beal: Information Reader No. I. 60 cents. Boston School Supply Co.

Bradish: Stories of Country Life. 45 cents. American Book Co.
Carpenter: Industrial Reader — Foods. 60 cents. American Book Co.
Chamberlain: How we are Fed, How we are Sheltered, How we are Clothed, How we Travel. 40 cents each. Macmillan.
Clifford: Information Reader No. II. 60 cents. Boston School Supply Co.
Chase and Clow: Stories of Industry. 2 vols., each 40 cents. Educational Publishing Co.
Carroll: Around the World. 3 vols., each 50 cents. Silver, Burdett & Co.
Fairbanks: Home Geography. 60 cents. Educational Publishing Co.
Fairbanks: Western United States. 60 cents. D. C. Heath & Co.
Johonnot: Geographical Reader. $1.00. American Book Co.
Kirby: Aunt Martha's Corner Cupboard. 35 cents. Flanagan.
McMurry: Type Studies from the Geography of the United States. 50 cents. Macmillan.
Parker: Information Reader No. III. 60 cents. Boston School Supply Co.
Rocheleau: Products of the Soil, Minerals, Geography of Commerce and Industry. 50 cents each. Flanagan.
Roth: First Book of Forestry. 75 cents. Ginn & Co.
Rupert: Geography Reader. 65 cents. Leach, Shewell & Son.
Sexton: Stories of California. 60 cents. Macmillan.
Stoddard: Lectures — California; Grand Canon; Yellowstone. $3.00. Balch.
Williams: Romance of Modern Engineering. $1.50.
Bandini: History of California. 75 cents. American Book Co.

The following geographical material is at your hand for the asking, prepaid; or, in a few cases, at the cost of its publication. All of it will prove of value to the teacher, and most of it may be placed in the hands of eighth grade pupils. Literature concerning almost any section or resource of California may be obtained free from the State Board of Trade, Ferry Building, San Francisco; California Promotion Committee, San Francisco; or the Chambers of Commerce and Boards of Trade of the various cities and counties of the state. Especial attention is called to the publications of the California Promotion Committee and the California State Board of Trade. The annual bulletins and occasional circulars of these organizations should be in each teacher's hands.

These bulletins and reports contain the geographical lore of our state and its industries that the great, wide world cares about. They are alive with the spirit of enterprise and progress. From them we can catch the hum of the busy workers.

Reports and Bulletins of State Officers and Organizations

California State Board of Trade: Annual Report, 1908 — California Resources and Possibilities (Free); Circular No. 8 — Dairying in California (Free). Address, Ferry Building, San Francisco.
California Promotion Committee: California Annual, 1907; 1908 (Free); Poultry in California, 5 cents; Dairying in California, 5 cents; Intensive Farming in California, 5 cents; Rainfall Map of California, 2 cents; Thermal Map of California, 2 cents.
California State Agricultural Society: Report, 1907. (Free.) Secretary of State, Sacramento.

California State Mining Bureau: Annual Bulletin, No. 49. (Free.) Ferry Building, San Francisco.

Commissioner of Public Works: Report containing Report of the Dabney Commission on the Reclamation Problem, 1905. (Free.) Secretary of State, Sacramento.

Debris Commissioner's Report on Reclamation Work and the Swamp Land Problem, 1907. (Free.) Secretary of State, Sacramento.

United States Geological Survey: The topographical maps of the Geological Survey are very interesting and valuable. They are printed in quadrangles, costing about five cents each. Each school should have at least the quadrangle including its own district; and the teacher with her pupils should study out the way to use it in traveling about, in finding new roads, in understanding the surface of the surrounding country. Address United States Geological Survey, Sacramento, California.

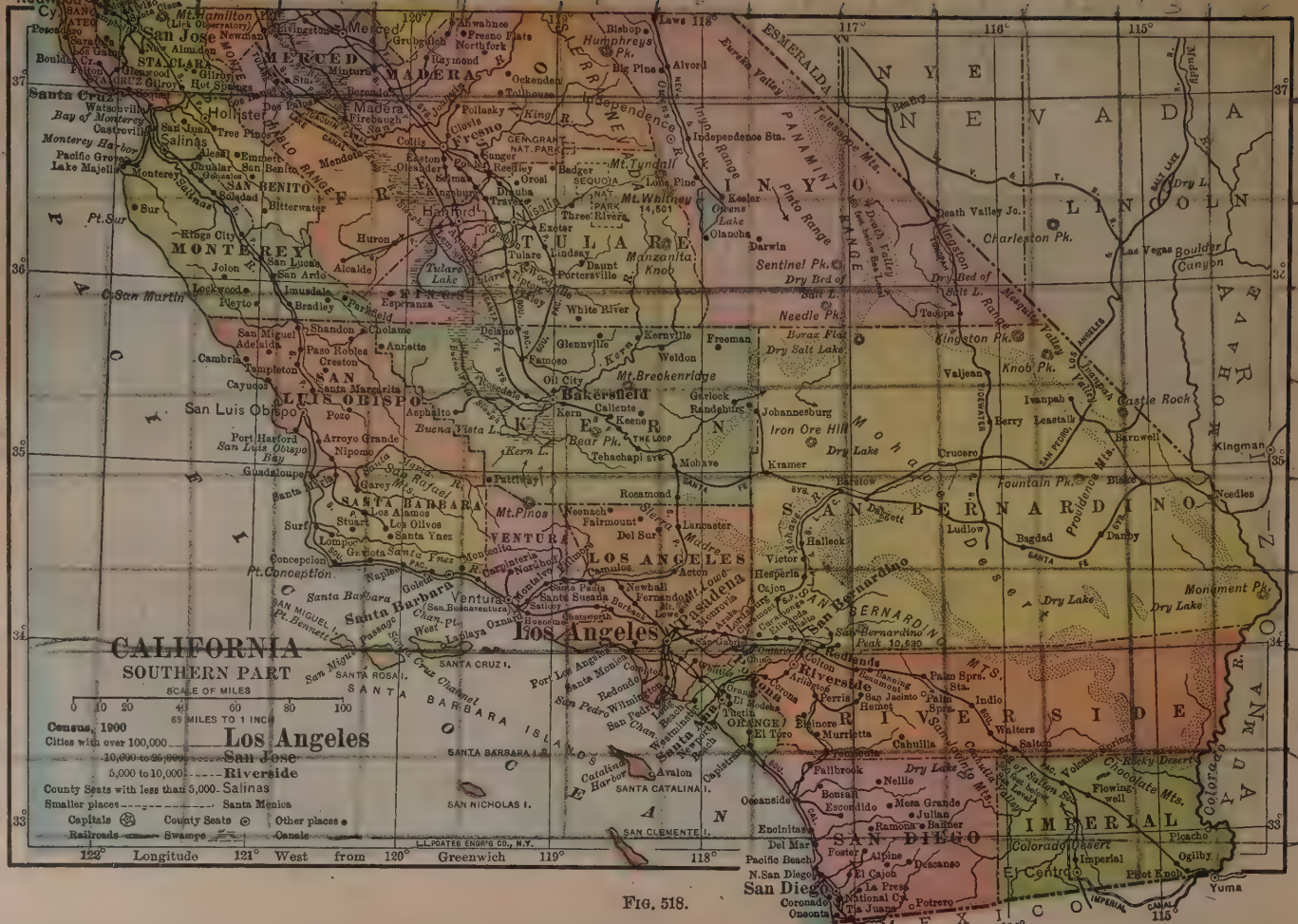
Several California railroads issue pamphlets dealing with scenic and economic aspects of our state. See what your local agent can secure for you. Above all, the national government, through the Department of Agriculture, has prepared for you a rich supply of supplementary matter, much of it of popular interest and non-technical in its expression. Write to the Department of Agriculture, Washington, D.C., for list of bulletins and circulars on hand for distribution bearing on farming, forestry, irrigation, and stock raising. You will find many of them of real value, especially the bulletins on forestry. This subject has been better and more simply treated in our government publications, which you can have for the asking, than in any other series, however costly.

FIG. 515.
The Home of Ramona, Camulos, Ventura County.

RELIEF MAP OF
CALIFORNIA
BY
N. F. DRAKE
Department of Geology, Stanford University.
ISSUED BY THE
CALIFORNIA STATE MINING BUREAU
LEWIS E. AUBURY
State Mineralogist
Area of California, 158,650 sq. miles
" 10 other States, 153,130 sq. miles
OREGON
MAINE
MASS.
N.J.
CONN.
VER.
N.H.
OHIO.
N.Y.
LAND SURFACE 48,070 SQ.M.
LAND SURFACE 40,460 SQ.M.
SAN FRANCISCO
LOS ANGELES
PACIFIC OCEAN
ARIZONA
MEXICO
Santa Barbara Channel
Santa Monica
Pt Fermin
Avalon
Pt. Loma
Coronado
N
S
E
W
MILES

FIG. 516.

CALIFORNIA
NORTHERN PART
SCALE OF MILES
0 10 20 40 60 80 100
69 MILES TO 1 INCH
Cities with over 100,000 . . . . . San Francisco
" " 50,000 to 100,000 . . . Oakland
" " 25,000 to 50,000 . . . Sacramento
" " 5,000 to 25,000 . . . Stockton
County Seats with less than 5,000 Colusa
Smaller Places . . . . . Tehama
Capitals: County Seats: Other places:
Railroads Swamps Highways
Census, 1900
Longitude 119° West 118° from 117° Greenwich
125° 124° 123° 122° 121° 120°
41° 40° 39° 38°
OREGON
NEVADA
PACIFIC OCEAN
Crescent City
Trinidad
Eureka
Arcata
Samoa
Blue Lake
Korbel
Ferndale
Fortuna
Rohnerville
Scotia
Burnett
C. Mendocino
Hayfork
Petrolia
Westport
Fort Bragg
Caspar
Mendocino
Albion
Elk
Willits
Ukiah
Potter Valley
Lakeport
Clear L.
Pt. Arena
Point Arena
Gualala
Cloverdale
Healdsburg
Santa Rosa
Petaluma
Sebastopol
Guerneville
Sonoma
Napa
Vallejo
Mare Island
Olema
San Rafael
Berkeley
San Francisco
Oakland
Alameda
FARRALLONES
Del Norte
Smith River
Lowbrook
Ager
Beswick
Scott Bar
Yreka
Montague
Ft. Jones
Mt. Hoffman
Etna Mills
Sawyers Bar
Gazelle
Edgewood
Igerna
Mt. Shasta
Shasta
McCloud
Dunsmuir
Callahan
Cinnabar
Castella
Hazelcreek
Fallriver Mills
Bayles
Burney
Haydenhill
Termo
Kennett
Iron Mountain
Round Mountain
Kenwick
Redding
Shasta
Igo
Anderson
Millville
Shumway
Merrillville
Susanville
Janesville
Amedee
Cottonwood
Red Bluff
Tehama
Greenville
Stirling Cy.
Vina
Lovelock
Corning
Orland
Paradise
Chico
Cherokee
Germantown
Willows
Fruto
Princeton
Maxwell
Colusa
Williams
Grimes
Arbuckle
Woodland
Knights Landing
Rumsey
Lower Lake
Kelseyville
Middletown
Calistoga
Winters
Davis
Dixon
Vacaville
Suisun
Fairfield
Benicia
Martinez
Pittsburg
Antioch
Oakdale
Modesto
Ceres
Turlock
Merced
Merced Falls
Snelling
Dos Palos
Los Banos
Gustine
Newman
Crows Landing
Patterson
Tracy
Livermore
Pleasanton
Niles
Hayward
San Leandro
Alvarado
Centerville
Irvington
Mission San Jose
Warm Springs
Milpitas
Santa Clara
San Jose
Gilroy
Hollister
San Juan
Watsonville
Santa Cruz
Capitola
Aptos
Soquel
Pescadero
Redwood City
San Mateo
Burlingame
San Francisco
Alameda
Oakland
Berkeley
Richmond
San Rafael
Sausalito
Mill Valley
Tamalpais
Point Reyes
Olema
Bolinas
Inverness
Petaluma
Sebastopol
Guerneville
Healdsburg
Cloverdale
Ukiah
Willits
Fort Bragg
Westport
Covelo
Laytonville
Round Valley
Dos Rios
Hopland
Lakeport
Clear L.
Kelseyville
Lower Lake
Middletown
Calistoga
St. Helena
Napa
Soda Springs
Sonoma
Vallejo
Mare Island
Benicia
Martinez
Pittsburg
Antioch
Oakley
Brentwood
Byron


CALIFORNIA
SOUTHERN PART
SCALE OF MILES
0 10 20 40 60 80 100
69 MILES TO 1 INCH
Census, 1900
Cities with over 100,000 — Los Angeles
10,000 to 26,000 — San Jose
5,000 to 10,000 — Riverside
County Seats with less than 5,000 — Salinas
Smaller places — Santa Monica
Capitals
County Seats
Other places
Railroads
Swamps
Canals
L.L.POATES ENG'G CO., N.Y.
Longitude 121° West from 120° Greenwich
NEVADA
ARIZONA
MEXICO
Los Angeles
San Diego
San Jose
Riverside
Salinas
Santa Monica
Santa Barbara
San Nicholas I.
Santa Catalina I.
San Clemente I.
Santa Cruz I.
Santa Rosa I.
Santa Barbara Channel
Santa Barbara Islands
Pacific Ocean
Mt. Hamilton
Mt. Tyndall
Mt. Whitney 14,501
Mt. Pinos
Mt. Breckenridge
Mt. Lowe
Mt. Wilson
Mt. San Jacinto
San Bernardino Peak 10,630
Sierra Nevada
Coast Ranges
Death Valley
Dry Lake
Salton Sea
Colorado Desert
Imperial Valley
Owens Lake
Mono Lake
Tulare Lake
Kern Lake
Salt Lake
Bakersfield
Los Angeles
San Diego
Riverside
Pasadena
Santa Monica
Pomona
Ontario
Redlands
San Bernardino
Pasadena
Long Beach
Santa Ana
Orange
Pomona
Ontario
Redlands
Riverside

RAILROAD MAP
OF
CALIFORNIA
Miles in Operation 9361.22
Total Valuation $122,082,273.00
1909
FIG. 519.
OREGON
NEVADA
PACIFIC
OCEAN
MEXICO
San Francisco
Sacramento
Los Angeles
San Diego
Oakland
San Jose
Stockton
Carson City
Reno
Fresno
Bakersfield
Mt. Whitney
Death Valley
Owens Lake
Mono Lake
Lake Tahoe
Tulare L.
Kern L.
Salton Sea
Colorado R.
Imperial Jc.
El Centro
Yuma
Needles
Las Vegas
Goldfield
Beatty
Ogden
Salt Lake City
Williams Engraving Co., N.Y.

GEOGRAPHY OF CALIFORNIA

A General View of the State

California is the largest state in the Union except Texas. Its coast line is a thousand miles long and its width is about two hundred miles. Its area is greater than that of New York, Ohio, New Jersey, Delaware, and all the New England States together (Fig. 516). The Empire of Japan with its fifty million people occupies a space but a little larger, while Great Britain and Ireland with a population of forty millions could be dropped down within the borders of California, and room left for a good-sized state besides.

Fig. 520.
Winter sport — Mountain Region.

The surface of California varies in elevation from three hundred feet below the level of the sea in its desert basins, up, up to more than fourteen thousand feet above the sea in its lofty mountains; and its climates range at the same time from torrid heat (Fig. 521) to arctic cold (Fig. 520). In its southeastern corner the rainfall is practically nothing; while in the opposite northwestern corner it rises to more than one hundred inches per year (Fig. 553). Its latitude reaches from that of Boston, away south to that of Georgia. It is washed by the greatest of oceans (Fig. 522) on the west, and is against the interior of a vast continent on the east. A bewildering complexity of mountains and valleys covers its surface, each having

an influence upon the direction of the winds and the distribution of the moisture and the heat.

The valleys are of all sizes, from the tiny one that affords a foothold for only one family, up to the Great Valley of California, more than four hundred miles long and fifty miles wide, and able to support a population of millions.

All this makes our state the most varied and wonderful one of all. It brings about strange differences in surface, soil, crops, trees, animals, minerals, and in the occupations of men. It makes California a difficult thing for us to grasp as a whole, almost impossible to think about all at once. So let us make several bites of our cherry by roughly dividing the state into regions each more or less unlike the other; then talk about them and think about them one at a time.

FIG. 521.
Ironwood grove—Colorado Desert.

If we were in a balloon high up over California, the thing we should notice first would be the fact that our ocean shore, our smaller mountain ranges, our great valleys, our long rivers, and our higher mountain chains are all parallel to each other, all extending northwesterly by southeasterly. We should notice, too, that the eastern and western mountain ranges curve together at the southern and northern ends of the Great Valley, and that the southern end of the state is a region of mountains and valleys running this way and that in all directions (Fig. 516). We should see, therefore, three long and narrow strips or regions running lengthwise of the state, and a fourth region south of these with its mountains and valleys tumbled about in considerable confusion. Thus we should find: (1) the Coast region, containing the slope to the ocean and the Coast Range mountains and valleys; (2) the Great Valley Region, from the Coast Ranges to the base of the Sierra Nevadas; (3) the Sierra Region,

containing the great Sierra Nevada Mountains; and (4) Southern California, made up of all the state south of the Tehachapi Mountains. Of course we must understand that these regions are not very definite and that they cannot be very accurately mapped, and that they differ within themselves. This is merely an offhand way of dividing the state so that we can think of one part of it at a time. Now for a view of each of the regions, and then we shall be ready for the stories,

FIG. 522.

The Pacific Ocean — Point Loma in the distance.

"Old Ocean's gray and melancholy waste —"

the pictures, the books, the songs, the specimens, the observations, and the travels about California that will really give us a knowledge of our state and an appreciation of all the wonderful and interesting things that it contains.

Note to Teacher. — Some of our best geographers divide California into *seven* regions or provinces, using the four above given, but calling the northern Coast Range the *Klamath Province*, the northern Sierras the *Volcanic Plateau*, and the southeastern region the *Desert Province*. Most teachers will find the simpler division handier and more workable for class use.

QUESTIONS

(1) Mention some interesting facts about the size of California; its extremes of altitude; of rainfall. (2) What is the direction of the great mountain ranges? (3) Why do we divide the state into regions? Name and describe them. (4) Point out on the Relief Map the four regions. (5) What terminates the Great Valley Region in the north? In the south? (6) How do the physical features of the state bring about differences in its productions and the industries of the people?

GENERAL QUESTIONS AND SUGGESTIONS

(1) Describe the main features of California as shown on the Relief Map. (2) Draw its outline and show the principal river systems. (3) What is the most important watershed? Describe the drainage. (4) Show on your map the mountain ranges, indicating where the highest mountain peaks are found. (5) Outline the Mojave and Colorado deserts, and locate Death Valley and the Salton Sea. (6) Why was it very hard to reach California before the railroads were built? (7) What would be the best road from San Francisco to Nevada? (8) Point out on the map the best way to drive from your home to San Francisco. (9) Has the relief of California influenced the course of the railroads? (10) Where is the heaviest rainfall in California? The lightest? (11) What is the usual rainfall of the region in which you live? (12) In what part of the state are there many lakes? Few lakes? Why? (13) Suppose the mountain ranges ran east and west, what would be the effect on the coast line? On the climate? (14) If California should sink one thousand feet, where would its coast line be? Draw a rough outline of it. (15) Would your home be submerged by the sea? (16) Find by the map the width and length of California in miles.

The Coast Region

The Coast Region consists of the mountains near the sea, — the Coast Ranges, — the slope between them and the ocean, and all the valleys nestled among the hills and along the rivers in this long, broken mountain strip (Fig. 516). The higher summits reach eight

Fig. 523.

Looking down the Strait of Carquinez.

or nine thousand feet in altitude. The whole mountain mass is cut through by Carquinez Strait (Fig. 523). South of this is Mt. Diablo Range, separating the Santa Clara Valley from the Great Valley Region. This is the landmark used as a starting point by the surveyors in measuring and describing all the land in the central part of the state. Mt. San Bernardino is similarly used for the Southern Region (Fig. 537).

In this region the west wind blows the most of the year. It brings to the land the water which it has picked up in passing over

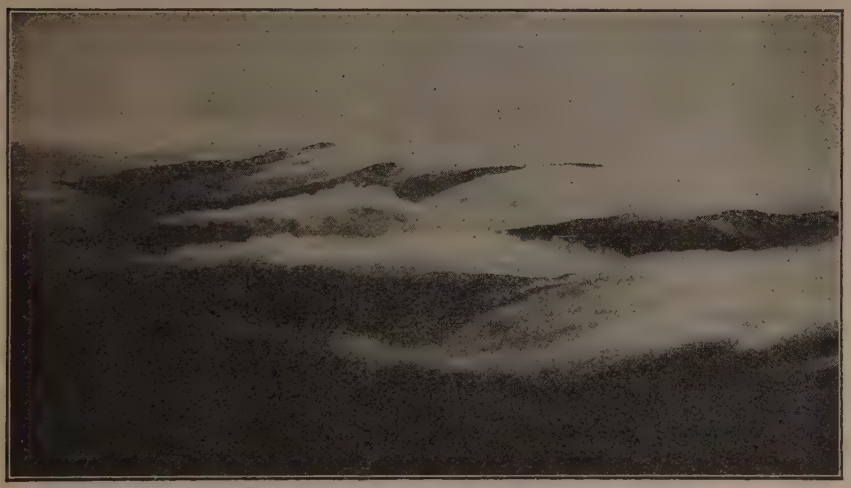


FIG. 524.
Ocean fog pouring over the hills into San Francisco Bay.

the sea, and so fogs (Fig. 524) in summer and rains in winter make the climate moist and cool. This narrow strip is the only region in the whole of North America and one of the few regions of the whole world where the weather is neither very cold in winter nor very hot in summer. This, too, is due to the west winds, which take their mild temperature from the sea in passing over it and then blow in to the land, keeping our coast warm in winter and cool in summer. A cool ocean current flows off the shores, and this, too, affects the west wind and the fogs.

Our harbors are few. This is because the mountain ranges run nearly lengthwise with the coast, instead of sticking out crosswise into the sea. Best of all these harbors is San Francisco (Figs. 525, 526), a noble and lordly bay, so large that all the navies of all the

FIG. 525.

Ferry Building, foot of Market Street, San Francisco, showing electric cars passing around the loop. San Francisco Bay, ferry boats, ocean vessels, and Goat Island in the distance. Notice the activities of commercial life. Write a description of what you see in this picture.

SONOMA
NAPA
SOLANO
GRIZZLY ISLAND
Novato
Petaluma Pt.
Ignacio
San Pablo Bay
Mare Island
Vallejo
S. Vallejo
Suisun Bay
Crockett
Benicia
Port Costa
Avon
Baypoint
Rodeo
Martinez
Pinole
Concord
Pacheco
MARIN
San Anselmo
San Rafael
Ross
Mt. Tamalpais
Larkspur
Point Richmond
Sobrante Ridge
CONTRA COSTA
Clayton
Walnut Creek
Mt. Diablo
3856 FT.
Lafayette
Ornida
Bryant
Berkeley
University of California
Alamo
Danville
Tiburon
Belvedere
Sausalito
Angel Island
Alcatraz I.
Emeryville
Oakland
Golden Gate
Fort Pt.
Presidio Reservation
Golden Gate Park
San Francisco
Ocean View
Alameda
Melrose
Mills College
San Leandro Bay
Elmhurst
San Leandro
Lake Chabot
San Ramon
Dougherty
Colma
San Lorenzo
Haywards
Haywards Sta.
South San Francisco
Baden Sta.
Pt. San Bruno
ALAMEDA
Mt. Eden
Millbrae
San Andreas Lake
Pt. San Pedro
Pt. San Mateo
Decoto
Niles
Alvarado
Centerville
San Mateo
Pt. Montara
Belmont
Crystal Springs Lake
Irvington
Newark
Mission San Jose
Warm Springs
Pillar Pt.
Half Moon Bay
SAN MATEO
Redwood City
Menlo Park
Palo Alto
Stanford University
Mayfield
Alviso
Milpitas
SANTA CLARA
Mountain View
Agnew
Lawrence
Santa Clara
San Jose
SAN FRANCISCO
AND VICINITY
Places are displayed same as on General Map
SCALE OF MILES
0 1 2 3 4 5 10
PACIFIC OCEAN
L.L. POATES ENGRG CO., N.Y.

FIG. 526.

Where ships and rails meet—Long Wharf, Oakland.

Key route pier—Ferry between Oakland, Berkeley and San Francisco.

world at once could ride at anchor within its shelter. Its present shape was caused by a slow lowering of the coast in ancient

FIG. 527.

The largest ferry boat in the world — *Solano* — crossing Strait of Carquinez. Capacity, four average size trains.

times, enough to let the sea flow into what was the lower valley of a great river of California, the united Sacramento-San Joaquin. This

FIG. 528.

"The Golden Gate" from San Francisco Bay. One mile wide.

great river flowed down through Carquinez Strait (Fig. 523), down through the valley that is now the bay, and poured its yellow tide

into the blue sea through the Golden Gate (Fig. 528). Now, however, the lower valley is under water, and is called a drowned valley. It makes a vast system of bays and inland waterways leading away up into the very heart of the state. Here around San Francisco Bay

FIG. 529.

San Diego Bay, Coronado Beach on the right, city of San Diego in the distance.

center the activities of the state. Here the commerce of the world passes from the high seas to the interior of our rich land. Here the people and the products of the land find easy means of passing out to all the world.

San Diego Bay (Fig. 529), Monterey Bay (Fig. 531), and Humboldt Bay (Fig. 532) are beautiful harbors, too. San Pedro

FIG. 530.

San Pedro Harbor.

(Fig. 530) is the chief harbor for Los Angeles. There are other harbors still, but these are the principal ones.

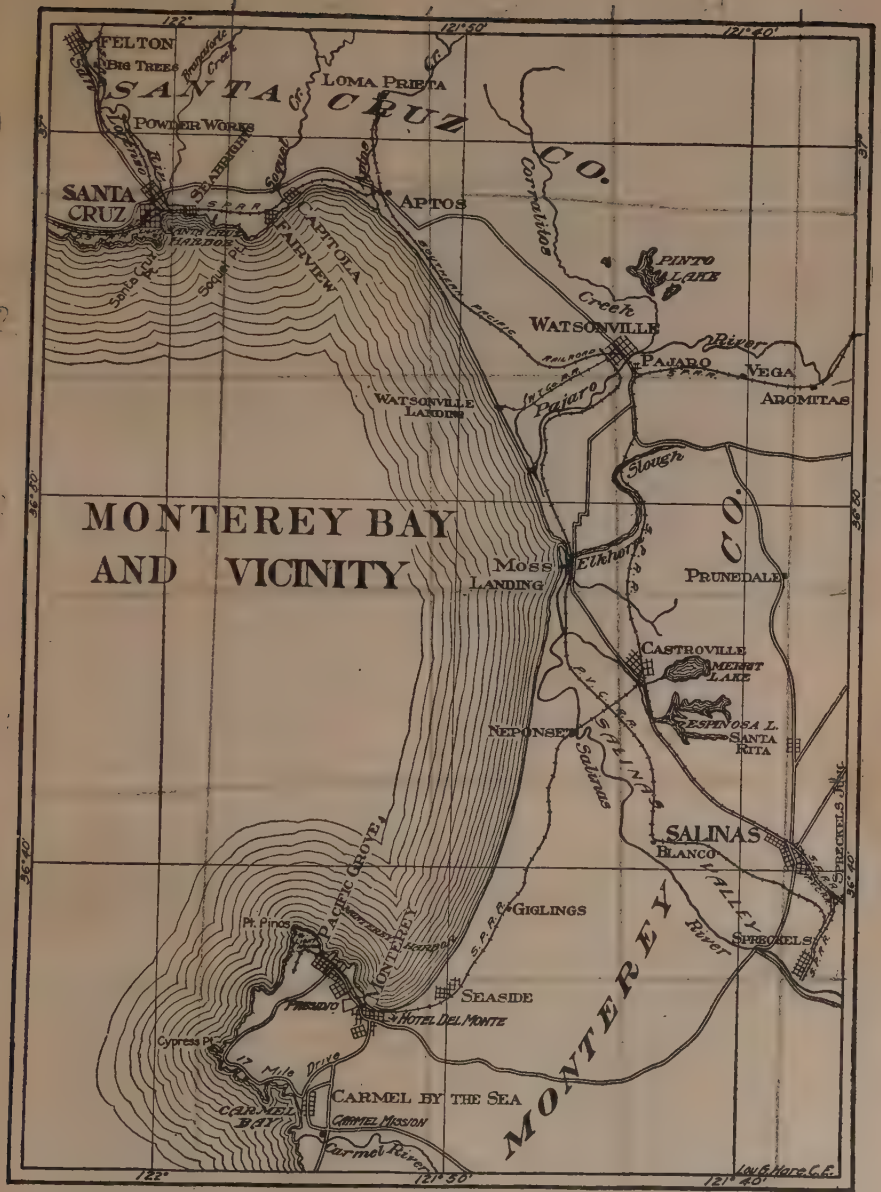

MONTEREY BAY
AND VICINITY
SANTA CRUZ
CO.
SANTA CRUZ
FELTON
Big Trees
Powder Works
Loma Prieta
Soquel
Aptos
Capitola
Fairview
Watsonville
Pinto Lake
Pajaro River
Pajaro
Vega
Aromitas
Watsonville Landing
Moss Landing
Elkhorn Slough
Prunedale
Castroville
Merritt Lake
Espinosa L.
Santa Rita
Neponset
Salinas
Spreckels
Blanco
Giglings
Pr. Pines
Cypress Pt.
Pacific Grove
Monterey
Seaside
Presidio
Hotel Del Monte
17 Mile Drive
Carmel by the Sea
Carmel Bay
Carmel Mission
Carmel River
Monterey Bay
Monterey
Salinas River
122°
121°50'
121°40'
36°30'
36°40'
121°30'
121°40'

FIG. 531.

FIG. 532.
Humboldt Bay and vicinity.

California's islands, like its harbors, are few; and for the same reason. If the ends of the mountain chains ran out toward the sea, many submerged hills would raise their heads above the water as islands. Off San Francisco are the Farallone Islands (Fig. 517), a little chain marking the tip-top summits of the most western ridge of the Coast Ranges, about thirty miles off shore. Between these and the shore the water is comparatively shallow; but outside it goes down at once to the depths of the deep sea. Within San Francisco Bay are several small islands used by the United States government: Alcatraz is a military prison and a fort; Goat Island, almost within touch from the ferry in crossing from Oakland to San Francisco (Fig. 525), has the naval training station; the government has a navy yard located on Mare

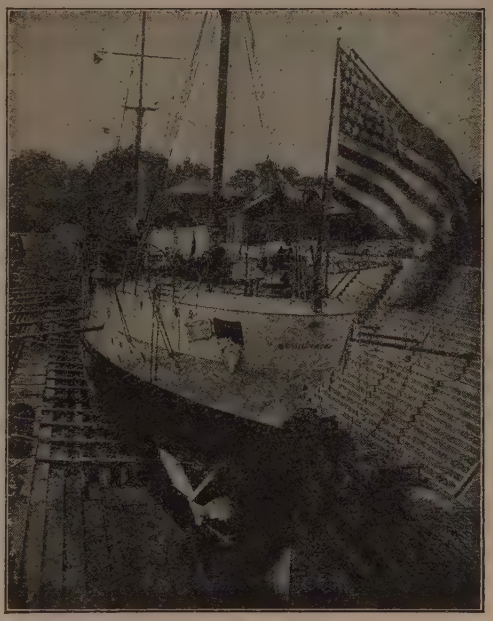


FIG. 533.

United States steamship *Bennington* in dry dock at Mare Island navy yard.

FIG. 534.

A typical coast town — Santa Barbara Islands in the distance.

Island (Fig. 533), and Angel Island is used as a quarantine station (Fig. 526). Off Santa Barbara and Ventura counties are the Santa

FIG. 535.
United States cruiser *California*.

Barbara Islands (Fig. 534). Santa Barbara Channel (Fig. 537), between these islands and the coast, is used by the federal government to test the war vessels (Figs. 148, 535) built on the Pacific Coast before accepting them from the contractors. Near San Luis Obispo are the San Luis Buttes, a succession of bold hills which terminate in "Morro Rock," a bare, rocky island rising to an elevation of about 600 feet (Fig. 536).

FIG. 536.
Morro Rock.

Capes, like harbors and islands, are few. Why? The most noticeable, perhaps, are Cape Mendocino on the rock-bound northern coast, and Point Conception (Fig. 537) in the south.

San Bernardino Mountains in midwinter. Oranges ripe in the valley below, Redlands.

State Industrial School, Whittier.

LOS ANGELES, SAN DIEGO,
SANTA BARBARA
AND VICINITY
SCALE OF MILES
0 10 20 30 40 50 60 70 80
44 MILES TO 1 INCH
SAN LUIS OBISPO
SANTA BARBARA
VENTURA
LOS ANGELES
ORANGE
RIVERSIDE
SAN BERNARDINO
SAN DIEGO
IMPERIAL
KERN
MOHAVE DESERT
PACIFIC OCEAN
Gulf of Santa Catalina
SANTA BARBARA ISLANDS
SAN MIGUEL I.
SANTA ROSA I.
SANTA CRUZ I.
SANTA BARBARA I.
SAN NICHOLAS I.
SANTA CATALINA I.
SAN CLEMENTE I.
Los Angeles
San Diego
Longitude 120° West from 118° Greenwich
MEXICO
L.L.POATER ENGR'G CO., N.Y.

FIG. 537.

Beach scene, Santa Barbara — Potter Hotel in the distance.

Beach scene, Santa Cruz — Casino and bath house — Sea Beach Hotel in the distance.

FIG. 538.

Bathing at Long Beach — Pleasure pier and casino.

South of Point Conception the coast line swings away to the east. Going inland from this point, we find the high Tehachapi Mountains running crosswise and forming a natural boundary between Southern California and the rest of the state. South of this line the rainfall becomes lighter, the natural vegetation scantier, the climate dryer and milder.

Mineral springs of various sorts are found in many parts of the Coast Region. In Lake County there are thousands of them. Health resorts have been established near many of these springs, and people

FIG. 539.

A bit of Lakeport on Clear Lake. Mt. Konocti, or "Uncle Sam," in the distance, rising 4246 feet in height.

come in summer time to drink or bathe in their waters. At one place five springs are found within a few feet of each other, and each of a different water. One is of clear, almost ice-cold mountain spring water, while another just at hand supplies strong mineral water steaming hot. Soda Bay, a shallow arm of beautiful Clear Lake (Fig. 539), is fed by soda springs in the bottom of the lake. One of these springs gushes up a foot or more above the level of the lake, and people go out in boats to drink the fine soda water it supplies.

The pleasure resorts on the beaches of the Coast Region are remark-

able (Fig. 538). The people flock to them in the summer time to enjoy the cool sea breezes, the surf bathing, the fishing, boating, and swimming that the salt water affords. Among the most famous points are Santa Cruz, Monterey, Pacific Grove, Pismo, Santa Barbara, Ocean Park, Huntington Beach, Santa Monica, Newport, Long Beach, Santa Catalina, and Coronado. An imaginary trip to one or more of these places might be made a jolly summer lesson by the geography class.

QUESTIONS

(1) Is the Coast Region mountainous or level? Describe its general features. (2) What strait cuts through it? (3) What mountain south of the strait? Find it on the map of San Francisco and vicinity, Fig. 526. (4) For what is it used? What mountain in the south is similarly used? (5) What is the prevailing wind of the Coast Region? (6) Explain how this affects the climate. (7) Tell about the harbors. (8) Which is the best? How was it formed? What is a drowned valley? (9) Mention three other important harbors. (10) Why are there few islands? (11) Describe the islands off the coast near San Francisco. Near Santa Barbara. (12) What islands in San Francisco Bay? For what is each used? (13) Name two important capes. (14) What are pleasure resorts? (15) Name those best known on the coast of California. (16) Describe any of these resorts or natural springs that you may have visited.

The Great Valley Region

This might well be called the region of interior plains. The valleys are so large, reaching from the lesser mountains of the coast to the giant Sierra Nevadas (Fig. 540) on the east, and the slope is so slight, only a foot or two to the mile, that they appear like vast level plains when we travel about in them, not like valleys at all. We can think of them as valleys only when we remember how the water flows (Fig. 541) from them, and where the drainage goes. They are made by a broad downward bend of the earth's crust, not by erosion, as were the steeper valleys of the mountains. They are covered deeply with sediment, for they were once the floor of the sea; and this is covered again by soil washed from the mountains and spread over the valleys by the rivers. They spread out into one of the largest and richest bodies of level land (Fig. 542) in the world. The northern part of this region is called the Sacramento Valley, the southern the San Joaquin Valley. To go from the Sacramento Valley northward into Oregon is difficult, for the Sierras and Coast Ranges come together as an elevated plateau about Mt. Shasta (Fig. 6); and to go southward from the San Joaquin Valley is still more

difficult, for the valley is rimmed by the Sierras and Coast Ranges coming together as the Tehachapi Range. The railroads wind through this tangled mountain mass by way of the Tehachapi Pass. The Tehachapi Loop is a famous piece of railroad engineering where the railroad crosses under itself through a tunnel.

The whole Great Valley Region is an inland one. Therefore it has less of the west wind, and so less fog, less rain, hotter summers,

FIG. 540.
Kings River Cañon — High Sierras.

and colder winters than the Coast Region. It is for the most part treeless; although in the north there are splendid groups of oaks (Fig. 542) dotting the plains; and in the south are great groves of cottonwood, pepper trees, and willow. In the southern end of the Great Valley is a group of broad, shallow lakes formed by the building of deltas across the San Joaquin Valley by the larger streams flowing down from the mountains, such as the Kern, the Kaweah, and Kings rivers (Fig. 544). Thus crosswise dams were formed, behind which the drainage of the San Joaquin basin was caught in such stagnant, reedy, alkaline lakes as Tulare and Buena Vista. More and more the water that flows into these basins from streams

FIG. 541.

Looking north on the Sacramento River. Southern Pacific railroad station and machine shops, Pioneer flour mill and wharf, in Sacramento County, on the right. Town of Broderick and river houseboats, in Yolo County, on the left. Notice in the distance the steel towers which carry the Bay City electric wires across the river.

FIG. 542.

Grove of oaks near Sacramento. A typical scene of the Interior Valley Region of Central California.

FIG. 543.

Street scene in Alameda, a city of beautiful homes.

FIG. 544.

Falls on Bubbs Creek — Kings River Cañon. A famous trout stream.

and artesian wells (Fig. 545) is being used for irrigation. Tulare Lake, once the largest sheet of water in the state, is disappearing and its rich sedimentary bed giving place to hundreds of splendid farms. Along the lower courses of the Sacramento and San Joaquin is an enormous body of overflowed land, called "tule land," perhaps two million acres in extent. Small parts of it have been reclaimed by building levees about it, sometimes twenty or even thirty feet high. This reclaimed land is as rich as the famous delta of the Nile. It produces wonderful crops of beans, onions, celery, and asparagus. The overflows are caused by the choking of the river channels by washings from the mountains. The "slickens" from hydraulic mines form a large part of this deposit. When the winter rains come and the mountain snows melt, the choked channels cannot carry all the water. Then all the lowlands along the river are flooded. Think what a loss this is to the wealth of the state. A hundred laws have been passed concerning it; a score of long reports have been written by committees; and twenty million dollars has been spent, here and there, first and last, in efforts to keep the water in the rivers where it belongs. But with all this, little has been accomplished. Little will be accomplished as long as each locality tries to keep dry by turning the flood waters off upon its neighbors. The remedy will only come from some great system of levees, dams, canals, and channel improvements which will protect all parts of the overflowed section and store the winter water for summer use. This is a great undertaking, worthy of the best efforts of our state or of our national government. The time is surely coming when it will be done; and

FIG. 545.
Artesian well, Kings County, 1858 feet deep — flows eight and one half inches over the pipe.

then these lands, as rich as any in the world, will offer pleasant homes and productive farms to thousands of people.

QUESTIONS

(1) Describe the Great Valley Region. (2) How was it formed? (3) Why is it hard to get into Oregon from this region? Into Southern California? (4) Is it easy to get to the ocean from this region? To go east into Nevada? (5) Compare the climate with that of the Coast Region. (6) Describe the timber growth. (7) Describe the lakes in the San Joaquin Valley, telling where found and how formed. What is happening to Tulare Lake? Why? (8) Where is the "tule" land? (9) What causes this overflow? How is the land reclaimed, and for what is it used? (10) How is this region drained? (11) Describe hydraulic mining. What is meant by "slickens"? (12) How do the overflows benefit the land?

The Sierran Region

The Sierra Nevada Mountains run lengthwise with the state along its eastern side. They were made by an upward bend of the earth.

Fig. 546.

Fishing in the Kern River Cañon.

"The river murmured over the pebbles,
The pines faintly whispered, and that was all."

The crest of this upward bend broke during ages past, and one edge of the break slipped up, the other down, by a long succession of little shocks, a few feet at a time. The upturned western edges of the break are the present summits of the mountains. The western

slope is long and gradual, down to the great valleys; the eastern is short and steep, almost overhanging the desert regions below and to the east.

The region is one of rough mountains, of dashing streams (Fig. 546), of splendid forests (Fig. 152), of yawning chasms (Fig. C), of lovely green meadows, of deep rocky cañons (Fig. 540). In

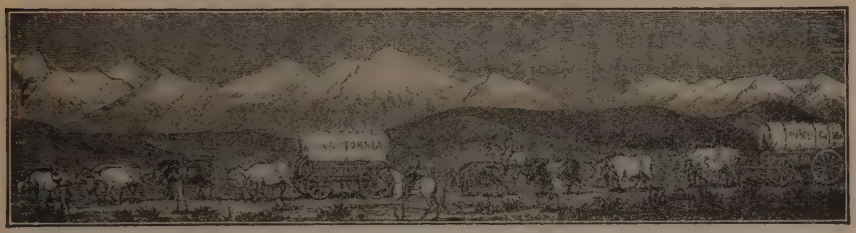


FIG. 547.

"In the days of old, the days of gold, the days of '49."

the higher altitudes, lumbering and stock raising are the occupations; in the lower parts, mining and fruit raising. The Mother Lode is a great series of ledges of gold-bearing quartz, reaching from El Dorado County in the north to Mariposa County in the south. It is about one hundred miles long and from one to six miles wide. Here is one of the famous mining regions of the world. In the cañons and streams near it and derived from it were the rich placer diggings that brought California's fame "in the days of old, the days of gold, the days of '49" (Fig. 547). From a single claim twenty-four feet square was sometimes washed more than $200,000 worth of gold by means of an iron pan about the size of a dish pan. Here, too, were the great hydraulic mines in which a powerful stream of water was sent through a nozzle, called a "giant," to tear down and wash away the banks of the river and the steep hillsides (Fig. 136). The

FIG. 548.

Chinaman washing gravel for gold.

gravel or placer mines are exhausted now, and most of the hydraulic mines are closed down. Quartz mining (Fig. 138) has developed in their place. Even yet, however, the children of Mariposa and Placerville sometimes find bits of gold in the streets after a heavy rain, perhaps worth a dollar or two; and a lone Chinaman (Fig. 548) may occasionally be seen working over again the piles of gravel that were washed by the older miners, so long ago.

The greatest wealth of the Sierras, however, is not in its gold, but in its water. The streams dashing down its cañons (Fig. 546) are

FIG. 549.

A Power House, where electrical power is generated from a mountain stream and sent far away to turn the wheels of industry and to run the cars in and about the cities of San Francisco Bay. Observe at the top of the hill the headgate where the water is admitted from the canal into the great pipes that lead it down under tremendous pressure to the wheels in the power house. Notice the force with which the water shoots from the wheels into the bed of the stream.

This plant is at Colgate in Yuba County and belongs to the Pacific Gas and Electric Company.

of great value now, and will be worth fabulous fortunes in the future. They will irrigate and make fruitful the farms and gardens for millions of people in the valleys below. They will supply pure,

cold drinking water for the valley cities. Already San Francisco and Los Angeles are taking steps to bring water from the Sierras to supply their people. The power generated from them (Fig. 549) will turn the wheels of industry and do the work of the state. There are many companies even now carrying the power of these swift rivers by means of electricity over many parts of the Great Valley and the Coast Region, and even out on the deserts of Nevada. Some of this power is used in cities one hundred and fifty miles from the power house (Fig. 550) away up in the Sierras where the

FIG. 550.

Interior view of the Edison Electric Power House, Kern River Cañon. Power from this plant is furnished Los Angeles and surrounding cities of Southern California, 120 miles away. Notice the large dynamos which generate the electric current.

water does the work. What a wonderful thing it is, and how interesting to learn about! Just think of our getting our light and heat, power to run our mills and factories, and the electric cars (Fig. 551) which carry us up and down all over the land, from these untiring, ceaseless rivers over a hundred miles away from us! We must guard these streams well. We must value them and see that they are used for the benefit of all the people of the future, not heedlessly given away to selfish speculators.

FIG. 551.

Passenger coaches, Northern Electric Railway. Suburban train running between Sacramento and Chico. Notice the "trolley" on the top of car, used within city limits; "third rail" used in the country. Why?

These rivers depend in large measure upon the forests (Fig. 152) for their even, steady flow. The roots of the forest trees and the soil which they help to form and then protect from washing, and the bed of fallen leaves and branches which they build up, hold the water that comes from the heavy rains. Little by little, all through the year this water seeps down into the river channel or trickles out in the form of springs (Fig. 552). Thus the rivers receive a constant supply, and are able to do the useful work to which men put them. If the forests were destroyed, many of the valuable streams would run dry in summer time, for the rainfall would quickly run down the naked hill and moun-

FIG. 552.

Natural spring flowing from the mountain's side. One of the many at the headwaters of Sacramento River. The water is as clear as crystal and icy cold.

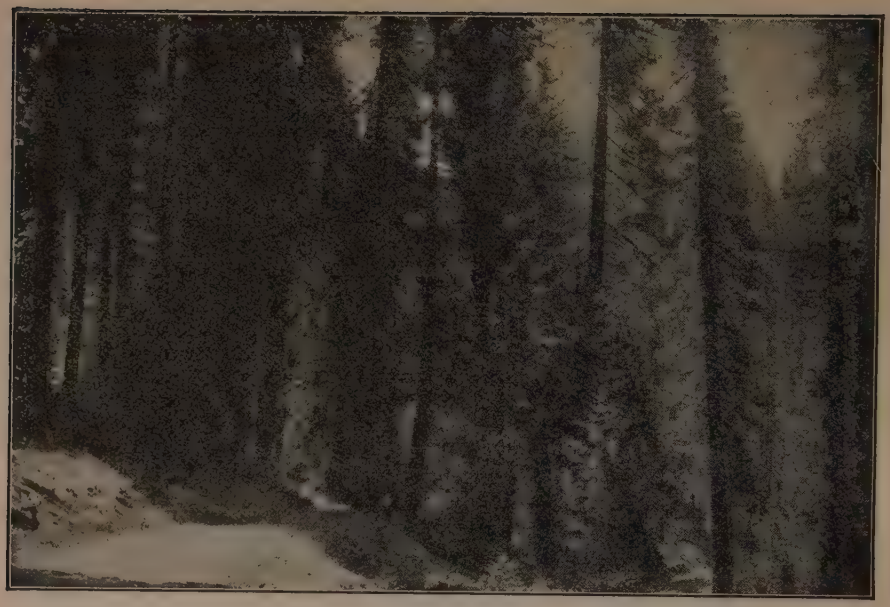
National Forests in California

	Area
1. Modoc	288,218
2. Warner Mountain	306,518
3. Klamath	1,896,313
4. Shasta	1,377,126
5. Trinity	1,243,042
6. Lassen Peak	897,115
7. Plumas	579,520
8. Diamond Mountain	642,424
9. Tahoe	1,363,124
10. Stanislaus	627,780
11. Sierra	5,049,934
12. Monterey	335,195
13. San Luis Obispo	363,350
14. Pinnacles	14,108
15. Santa Barbara	1,981,323
16. San Gabriel	555,520
17. San Bernardino	737,120
18. San Jacinto	668,160
19. Trabuco Canyon	109,920
	19,035,810

20. Proposed National Forest
21. Whitney Military Reservation
22. Proposed National Forest (Stony Creek)

The Lake Tahoe National Forest extended to include the Yuba Reserve, September 17, 1906.

FIG. 553.



Virgin Forest.

Sierra National Forest, Madera County, near Wawona, on road to Yosemite Valley.

Destruction of forest due to logging and to fire. Stanislaus National Forest, Tuolumne County.

tain sides. Thus we should not only lose our trees; but our streams, that mean so much to the prosperity of the state, would be dangerous torrents in winter time, bringing flood and damage ; and in summer they would be dry gulches, barren and glaring in the hot sun. The United States government is trying to preserve our forests, and thus preserve our rivers, which rise on the wooded mountain sides. Millions of acres of timber land have been reserved as National Forests (Fig. 553). This means that these forests have been set aside and cannot be taken up by private owners. Instead, the government places rangers (Fig. 554) in charge of them, to see that they are protected. Any one who wishes to cut timber on these National Forests must first get permission and pay something for the privilege ; he must cut only the mature trees, and must not destroy the young trees or set fires. These National Forests are reserved by the government so that the forests may be used without being destroyed ; so that our children and our children's children may have lumber in the years to come; so that these priceless rivers that irrigate the land and do the work in the valleys below may always add to the wealth of all the people.

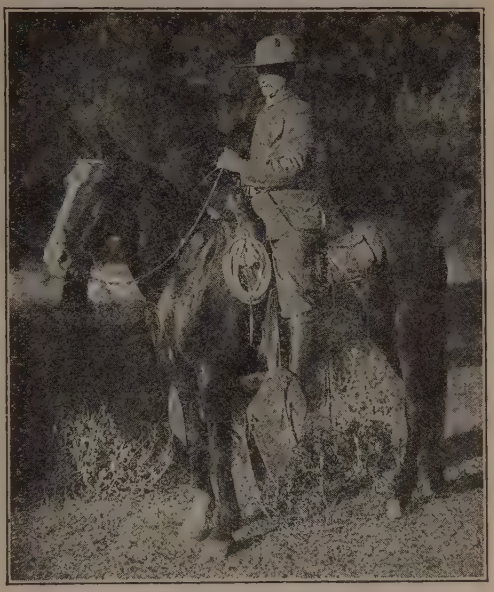


FIG. 554.

U. S. Forest Ranger — Santa Barbara National Forest. Rangers guard the interests of the Government by protecting the forests from fires and the timber from vandalism.

In the sheltered little valleys near the central and highest part of the Sierras, stand a few groves of the Big Trees, found nowhere else in the world. The Calaveras Grove, the Mariposa Grove (Fig. 152), the Tuolumne Grove, are well-known examples. The Big Tree is a cousin to the redwood of the Coast. Its botanical name is Sequoia Gigantea, while the redwood is Sequoia Sempervirens. Its lumber is very much like redwood, and is used for the same purposes. Large quantities of it are shipped to Germany to make lead pencils.

Counting the rings of some of the great trees that have been chopped down, we find them to be over four thousand years old. Think of it! They were already ancient trees when Christ walked the earth. They were already three thousand years old when Columbus discovered America, yet the man with an ax (Fig. 139) can destroy in a few days what has required all the centuries to grow. One of the largest trees is the Grizzly Giant (Fig. 555) in the Mariposa Grove. It is 35 feet in diameter and 300 feet high. It is an interesting thing for a class to join hands in the schoolyard and make a circle as big around as the Grizzly Giant: then try to imagine the circle filled with solid wood, a great column towering to the sky.

FIG. 555.

"Grizzly Giant" — Has lifted its head toward the heavens for over four thousand years.

"My heart is awed within me when I think
Of the great miracle that still goes on,
In silence, round me." — BRYANT.

This central part of the Sierra Nevada Mountains, where the big trees are found, is known as the High Sierras (Fig. 556). It is a region of granite peaks and deep cañons. No less than eleven of the summits are over 14,000 feet high. The highest peak of them all, and the loftiest summit in all the United States, is Mt. Whitney 14,501 feet high. One of the famous cañons is the Yosemite (Fig. 557), on the upper Merced River. This is a wonderful gorge cut out by glaciers, with mighty, cliff-like walls of granite towering 3000 feet above the valley floor. Over these walls tumble a number of streams to join the Merced, making the highest water falls in the world. The famous Yosemite Falls (Fig. A) are over 2600 feet high, making three successive plunges with short rapids between. We get a better idea of this height when we remember that Niagara is only 160 feet high. People come from all over the

FIG. 556.

The Whitney Range of the High Sierras, called "the roof of the United States." Notice how plainly the timber line is marked.

FIG. 557.

A view of the floor of Yosemite Valley. Bridal Veil Falls on the right, Merced River in the foreground, El Capitan on the left, the perpendicular face of which is larger than a farm of 640 acres.

"God moves in a mysterious way His wonders to perform."

Fig. 558.
Looking down Kern River Cañon.

world to see this wonderful valley. Kings River (Fig. 540) and Kern River (Fig. 558), too, have magnificent cañons similar to the Yosemite, but not so well known.

In the Sierras are many lakes formed by glacial action. Some are basins scooped out of the solid rock by the glaciers; others are formed from the damming of water courses by the moraines left by the melting glaciers; still others are formed by the damming of valleys by lava flows. These beautiful Alpine lakes vary from clear, cold pools a few yards across up to matchless Lake Tahoe (Fig. 559) 6225 feet above sea level, twenty-three miles long, thirteen miles

Fig. 559.
"Matchless Lake Tahoe" with the snow-capped Sierras in the distance. Forty years ago Mark Twain said, "It must surely be the fairest picture the whole earth affords."

wide, situated at the "elbow" of California and partly in Nevada. These lakes are full of many kinds of trout, and offer rare sport to the fishermen (Fig. 560). They add greatly to the scenic attraction of the mountains. At Boca on the Truckee River is a natural ice plant (Figs. 561–562).

FIG. 560.
Trout fishing on Lake Tahoe.

The High Sierra region (Fig. 556) has been called the roof of the United States, since it is the highest place. It has been called the playground of America, since its cañons, its forests, its peaks, its trout streams, its flower-spangled meadows, its cold lakes, its pure clear air, its crystal water, its wonderful scenery, all

FIG. 561.
Cutting ice on the Truckee River. Notice the freight cars waiting to be loaded with ice for market. Observe the dress of the workmen.

go to make up an ideal region for an outdoor summer life. Along its cool trails and in its deep forests tired humanity builds up again. We should help along all patriotic efforts to preserve this great pleasure ground in its natural condition, as a precious treasure to pass along to our people of future generations. If we spoil it, destroy it, waste it, give it away, or permit it to be stolen from us, it can never be reproduced. Once gone, it will be gone forever. If we are cowardly or indifferent, it will all be seized by plunderers, who care only for themselves, and who wish only to coin its trees, its grass, and its waters into ready money, to be carried off and spent, regardless of the loss that this would bring to the people of our state for all the years to come.

FIG. 562.

A storehouse for ice. Notice how the men catch the large cakes of ice and work them over toward the tramway where they are caught and carried up into the storehouse. Thousands of tons are stored in this manner in winter and kept for summer use.

The northern end of the Sierran Region flattens out into a volcanic plateau, with occasional lofty peaks standing out alone, such as Mt. Shasta and Lassen Peak. This leads north into the Cascades of Oregon. The plateau occupies most of Modoc, Shasta, Siskiyou, and Lassen counties. The country is largely made up of lava and other volcanic rocks. The lava from Mt. Shasta is often carved into ornamental shapes and taken away by tourists as souvenirs. Hot springs abound. Shasta water is known all over the world, and is an important article of commerce. Underground streams are not uncommon. They come out from under the lava as great springs. One in Shasta County makes a whole river — Fall River, tributary to the Pitt. The latest volcanic activity of the United States was that about the base of Lassen Peak, perhaps less than a hundred years ago. Some very perfect volcanic cones are found with lava, ashes, and cinders, so recent that vegetation has not yet started to cover them. The trees burnt off are not yet rotted away. The

lava beds of Modoc County are well known as the hiding places of Captain Jack and his band of Indians during the Modoc War of 1873. It is interesting to note the mountain passes that have been so carefully chosen by the engineers who built the transcontinental railroads eastward through the difficult Sierras. Farthest north,

FIG. 563.

Traveling by rail over the High Sierras in midwinter via Donner Pass.

the Western Pacific chose the Beckwith Pass. The Central Pacific occupied the Donner Pass (Fig. 563). In the south the Southern Pacific went through the San Gorgonio Pass, while the Santa Fé and the Salt Lake use the Cajon Pass.

QUESTIONS

(1) What is the Sierran Region? (2) Tell how the Sierra Nevada Mountains were made. Why are they so steep on the eastern side? (3) What are the main industries in this section? (4) Where is the Mother Lode? How long is it? (5) How did the first miners in California work? (6) Describe quartz mining (p. 153). (7) Tell all you can about the value of the streams of California. How are they used? (8) Write a composition on the subject, "Why our forests must not be destroyed." (9) How is the government preserving the forests? (10) Tell about the Big Trees. Describe their size and age. (11) Where are the High Sierras? Describe them. (12) Which is the highest peak in the United States? How high is it? How many peaks in the state are over 14,000 feet high? (13) Tell about Yosemite Valley. (14) Tell what you can of Kings River Cañon; of Kern River Cañon. (15) How do the lakes of this region differ from those of the Valley Region? How were they formed? (16) Describe Lake Tahoe. Describe the northern end of this region. Name two high peaks. (17) Can you tell

something of the cutting and storing of natural ice? (Figs. 561, 562). (18) In what part of the region has there been recent volcanic activity? (19) Describe the lava beds, and tell for what they were noted. (20) Trace on your maps the four different routes taken by the railroads through the Sierra Nevadas.

Southern California

This region (Fig. 537) lies south of Point Conception and the Tehachapi Mountains. It is divided into an eastern desert portion and a fruitful western one by the Sierra Madre, a high mountain wall composed of the San Gabriel, San Bernardino, and San Jacinto ranges, with low passes between. This is the Southern representative of the Sierras, and is like them in plants, animals, and climate (Fig. 564), although the summits are not quite so high.

Fig. 564.

Bear Valley in San Bernardino Mountains. How does the timber compare with that of the Sierra Nevada Mountains?

The desert portion of Southern California is very large, about one sixth of the whole state. It includes the Mojave and Colorado deserts. It is divided into many broad valleys and basins by hundreds of mountains and ranges of mountains. Some of these are dry plateaus several thousand feet above the sea, while others are low sinks hundreds of feet below the sea, such as Death Valley and the Salton Sea. Nearly all moisture is cut off by the high mountains. A little rain falls and there is an occasional cloudburst; but the water is soon lost in the dry cañons and the hot sands. The summer weather is very hot, sometimes 130° in the shade. Many a poor prospector or traveler ventures too far into these wastes, and leaves his bones to bleach in the blazing sun.

The broad level valleys of this region appear to be old lake bottoms dried up, or nearly so, since a time when there was a much greater rainfall. When these lakes are nearly dry, the water is heavily saturated with various salts and alkalis that have washed

down from the neighboring highlands. When the Salton Sea was dry, a layer of pure salt a foot thick covered many square miles, and was worked for several years by a great salt company (Fig. 565).

FIG. 565.

Harvesting salt from the bottom of the Salton Basin before the overflow. The salt scraped up into piles is ready to haul to the mill. All this is now deep beneath the waves of Salton Sea (Fig. 567).

A similar deposit is found in Inyo County. A layer of rock salt of unknown depth is found in San Bernardino County. From the water of Owens Lake, carbonate of soda is extracted by evaporation (Fig. 566) and is shipped out to the world at the rate of two carloads per day. Some of the old lake bottoms near Death Valley yield borax, some soda, some niter, and some a mixture of these salts. The region is a chemical storehouse on a great scale. There are many interesting things to learn about it — fortunes in it for those who find out how to go and get them.

FIG. 566.

Owens Lake, Inyo County, showing soda evaporating basins, inclosed by banks of mud. The lake water is pumped into the basins and evaporated by the heat of the sun.

Rich mines of gold, silver, copper, and lead are found on these deserts, and gem stones, such as turquoise and opal. Some people

think the deserts contain more wealth than all the fruitful country on the other side of the mountains. One of the most interesting and wonderful parts of the desert is the great area known as the basin of the Salton Sea (Fig. 567). This was once the upper part of the Gulf of California, but was long ago cut off from it by the sand and mud brought down by the Colorado River. When the water dried up, an empire of dry, loamy land was left, in the shape of great plains that sloped very gradually toward the bottom of the basin. A small lower part of the basin was not good soil, being covered with salt and sometimes with water by the breaking over of the Colorado. The interesting

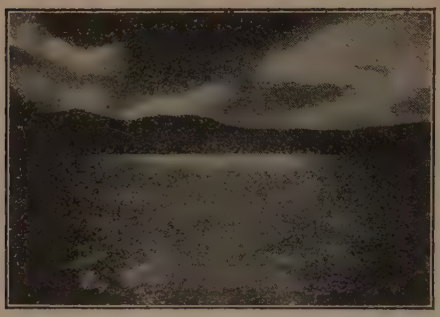


FIG. 567.

Salton Sea, 253 feet below sea level, 36 miles long, 12 miles wide, 34 feet deep. Formerly from the bed of this sea was harvested thousands of tons of salt (Fig. 565).

FIG. 568.

This beautiful artesian well gushes out of the parched and burning soil of the Colorado Desert, in the Salton Basin. The water is very pure and clear, and flows smoothly over the pipe and into the pool beneath with a gentle murmur, all in the very place where men have died of thirst. This well has been sunk by some settler, who will clear away the greasewood brush, the mesquite trees, and reclaim a fertile little farm by means of the stream from this murmuring fountain.

thing is that this part of the desert is even now being reclaimed and made to support its share of the human race. Of course it is irrigation that does it. The high temperature and the rich soil are just the things needful for luxuriant plant growth, if water can be added to them. The western portion of the basin reaches the base of the San Jacinto and San Bernardino mountains, whose summits are high enough to catch rains and snows from the sea winds. This moisture flows down under the desert sands and comes up again in the artesian wells (Fig. 568) that are now being sunk on the desolate wastes where men formerly lost their lives from

FIG. 569.
Headgate, Imperial Valley Canal, Imperial County

thirst. Each well reclaims a little farm from the grip of the desert; and thus the western end of this desert is disappearing. In the eastern end of the basin, toward the Colorado River, it was found a simple matter to take out canals (Fig. 569) from the river at the Mexican boundary, and irrigate the lands downward toward the bottom of the basin.

Thus grew up the settlement called Imperial. Seven years ago not one single white man lived in the whole expanse. To-day there are towns and schools and railroads and electric lights and 12,000 people! It has been made into a new county, a county on the desert and below the level of the sea. Thus the eastern end of the basin is being changed from a desert waste to fruitful land. The Colorado is one of the great rivers of the continent. Perhaps its waters will yet wash the deserts of California entirely off the map. Here again lies work to do and fame and fortune to fight for. There

is plenty of opportunity in the future for the thoughtful and courageous boys who are now so busy going to school.

The crops in this basin are so much earlier than anywhere else that it might be called the hothouse of America. Cantaloupes and

FIG. 570.

Cutting alfalfa for hay in December. Grown in Imperial County by means of irrigation.

apricots ripen in May; grapes and peaches in June; hay can be cut in December (Fig. 570). Wonderful crops of barley, sorghum, alfalfa, melons, and vegetables are grown. This would be a fine place for another imaginary journey, in which you would probably learn the striking story of how the whole tide of the Colorado River broke through (Fig. 571) the Imperial Country into the Salton Basin in 1905, and how it was stopped.

FIG. 571.

New River. Formed by the breaking through of the Colorado River and resulting in the making of the present Salton Sea, Fig. 567. Notice the large cracks on the river bank caused by the water washing away the soil.

Southern California west of the Sierra Madre Mountains is one of the richest and most famous regions of the world. It is a strip averaging about sixty miles wide, broken up into many valleys (Fig. 572) by a multitude of hill and mountain

FIG. 572.

An orange grove in a valley of Southern California. San Bernardino Mountains in the distance.

FIG. 573.

Irrigating an orange grove.

ranges. The rainfall though scanty is sufficient to form numerous rivers and streams and artesian basins. These have been carefully utilized for irrigation (Fig. 573), and have made a wonderful transformation of the whole land. It has often been said that water is like magic, and that at its touch the country blooms. People buy water rather than land. That is, the land is of no value unless there is water available to go with it. Thirty years ago the region was an

FIG. 574.

Spring Street, Los Angeles, during parade of naval officers, April, 1908.

arid sheep pasture, with a few sleepy Mexican villages scattered here and there. Now these eight southern counties contain a quarter of the people of the State. Los Angeles is second only to San Francisco in size; and is a fine modern city (Fig. 574) with magnificent buildings, princely hotels, huge stores, and all that goes to make a city great. It is the center of a wonderful railroad and trolley traffic. Electric roads make a network over the whole land, connecting scores of towns and cities. These southern cities are famous for their beautiful homes (Fig. 575) and their splendid avenues. Their wide streets are paved or oiled to keep down the dust, and

are shaded by great trees. The homes are surrounded by lawns and shaded by vines and trees, and adorned by flowers (Fig. 154). It

FIG. 575.
A beautiful home in beautiful Pasadena.

pays to make a country attractive and beautiful, so that visitors are pleased and people want to make their homes there. Orange groves in these choice localities are worth a thousand dollars per acre.

QUESTIONS

(1) What mountains cut off Southern California from the other regions? (2) What mountains divide this region into two parts? (3) How are these mountains like the Sierras? (4) Describe the eastern desert part. (5) Why is there little rain? (6) Why is it dangerous to venture far out on the desert? (7) In what county is Death Valley? Salton Sea? (8) Why was salt deposited by Salton Sea? (9) How was Salton Sea formed? (10) How is this basin being reclaimed now? (11) Why is this region called a chemical storehouse? What minerals are found here? (12) How is the eastern end irrigated? (13) Why is there luxuriant growth of plant life here? (14) Tell what you can of Imperial County. Describe its crops. (15) How is the western end of this basin irrigated? (16) What of the section west of the Sierra Madres? Name its largest cities. For what are they famous? (17) Why did Los Angeles grow to be the largest city of the south? (18) How is water secured in this section? (19) Describe an artesian well. (20) Describe the homes of the southland.

DAIRYING

Dairying is the great industry of the Coast Region. The cool, moist climate provides plenty of green grass for the cows, and the weather is so mild that the dairyman does not have to build expen-

sive barns and milking sheds to shelter his stock (Fig. 576). Every one says that California butter has the best flavor; and this is no

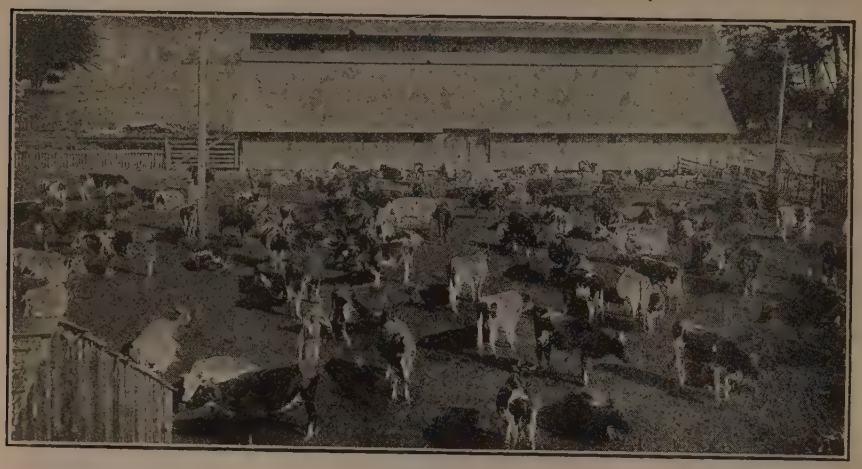


FIG. 576.
A dairy ranch in San Mateo County. Milking the cows out of doors in a corral.

wonder when one remembers that the cows have green grass to eat almost the whole year round. Humboldt and Marin counties are especially known for their dairies. We must not think, however,

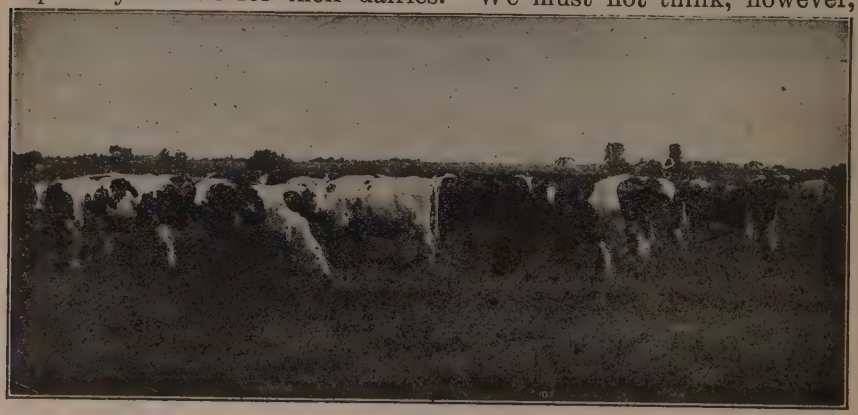


FIG. 577.
Milch cows feeding on the rich alfalfa pasture.

that the rest of the state produces no butter, for every county in California has some share, large or small, in this great business. In the irrigated districts of the Great Valley and the Southern Region the green alfalfa fields feed (Fig. 577) thousands of cows. Alfalfa

is a forage plant, belonging to the clover family. It grows luxuriantly (Fig. 578) in the sandy soils of the interior when irrigated, and remains green a large part of the year. Splendid dairies are growing up in the Great Valley Region and in Southern California, depending upon alfalfa as fodder. This change made in the agriculture of a whole state by one small plant is a most interesting story. It is worth further study and inquiry. Mrs. Sherman, of Fresno County, proved that the interior could make as good butter as the

FIG. 578.
Stacking alfalfa hay — Stockdale Ranch — Kern County. Grown by irrigation.

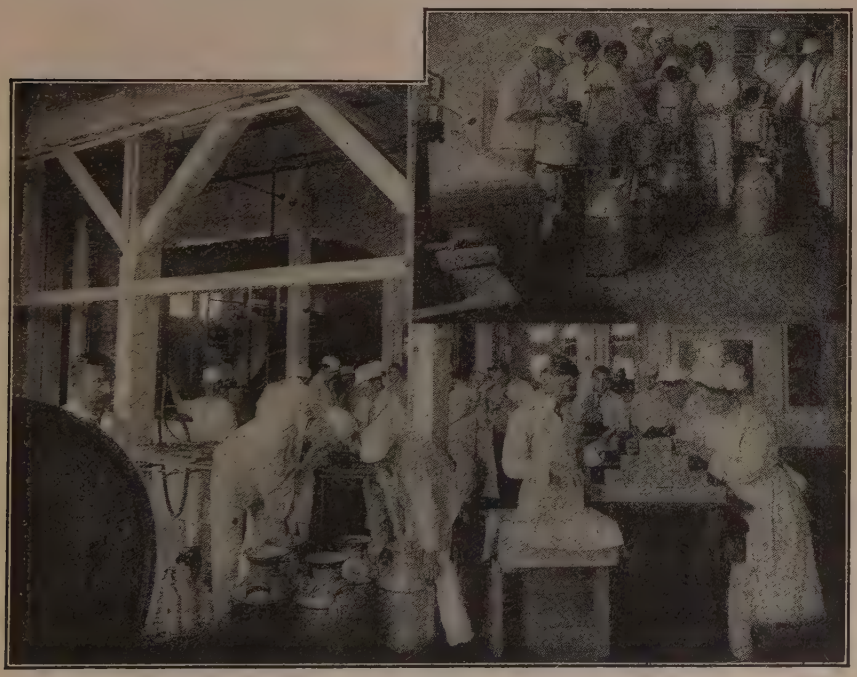


FIG. 579.
University Farm Creamery, at Davis. Separators in upper picture; churns, and packing butter for market, in lower picture. What else do you see?

Coast by taking the first prize at the State Fair a few years ago. Her prize tub of butter was made and shipped with the thermometer at 104°, so the greater heat of the interior does not prevent success.

On some of the larger dairy ranches, the owner makes his own butter; but more often he runs the fresh milk through a separator and then sends the cream by wagon or train to some creamery (Fig. 579), where he is paid for it according to its richness. The skimmed milk goes to the hogs, calves, and chickens, and a thrifty dairyman will often make half as much from these as he does from his butter. With all our cows and dairies (Fig. 576), however, we should sometimes have to eat dry bread if we did not import butter from other states. We are not yet able to supply our own markets all the year. Dairying is a profitable business. Many who started dairying a few years ago with nothing are now rich men, with land and stock, fast becoming the leaders of their communities. There is plenty of opportunity for California boys who are not afraid to get up early in the morning and work hard, and who are willing to learn how to take the best care of the stock and stick to the business. The best of it is that one can start in a small way, without much money.

QUESTIONS

(1) Why has the Coast Region been the most important dairying section? (2) Is the industry growing in other regions? Why? (3) Describe the alfalfa. (4) Tell what the farmer does with his milk. (5) Does California produce enough butter to supply her own markets?

Agriculture

Agriculture is by far the most important industry in the state. Agricultural products are ahead of those of any other industry. Cities, railroads, and business depend upon the farms. The future prosperity of the people rests upon the soil. Seeing this, it is interesting to remember that only fifty years ago it was believed quite generally that the country was practically worthless for agriculture, and that as soon as the gold was exhausted, the greater part of the population would go away, leaving only a barren, hopeless waste behind.

Here is a word picture of the agriculture in one of the large valleys of the Coast ranges: "It is a pleasant sight to look down into one of these rich valleys from the hilltops surrounding it. First, right beneath us are the rolling foothills where we see herds

of cattle or flocks of sheep. Just beyond are vineyards and a great wine cellar, half of it built into the hillside. Farther out stretches the valley floor, dotted with its farmhouses. Spread out around the farmhouses are waving cornfields, hayfields in which men are at work, wide checkerboard blocks of grain just turning yellow, orchards with the fruit pickers busy under the trees, and hop fields overrun with vines trained high on wires stretched from the tops of poles. Over near the center of the valley is a busy little city. We can see its roofs and steeples half hidden by the shade trees lining its streets. Along the roads from all directions farm wagons are crawling toward the town, carrying their fruit to the canneries, and their hay and grain and butter to the railroads for shipment to the big cities. A few years ago, when our fathers were boys, this valley was all one open field with herds of wild-looking cattle roaming through it, for it was then nothing but a great Spanish grant, and one man owned it all. Now it raises enough to feed many thousand people, and its products are so varied that we wonder how one climate and one soil can produce them all. We are glad when we hear that many of the farmers and business men who have made these farms and built this town are well to do; that they have good homes, some money in the bank, and their boys and girls in the schools. We feel that they have deserved to succeed."

Poultry and eggs for market are raised throughout the state; but Petaluma is famous as the most important center of this industry.

FIG. 580.

A poultry farm near Petaluma. Notice the number of chicken houses in which the chickens roost and where they lay their eggs.

For miles around Petaluma stretch the poultry farms (Fig. 580), each a good-sized city of chickens. Hundreds of chicken houses may be seen from the road, all of them spick and span in clean

whitewash. Thousands of chickens (Fig. 581) are scattered over the fields. These chickens are hatched in incubators, several hundred at a time. Then they are turned into brooders (Fig. 582), where they are kept warm and given special food until they are able to go out and scratch for themselves. The poultry man is always trying to improve his stock by keeping only the best layers. Careful chicken-raisers find that their hens pay them a dollar a year each in clear profits. You can see what such an income would mean to the owner of ten thousand chickens. Nearly every boy and girl in California, save in a few of the larger cities, is able to have a small flock of chickens in the back yard. If you find out what sort of chickens to get and then learn to take good

FIG. 581.

A flock of white leghorn hens. They did their share toward producing the 4,422,968 dozen eggs furnished the markets of the state from Petaluma alone. To supply the market in 1907, 10,854,000 dozen eggs were shipped into the state from the East.

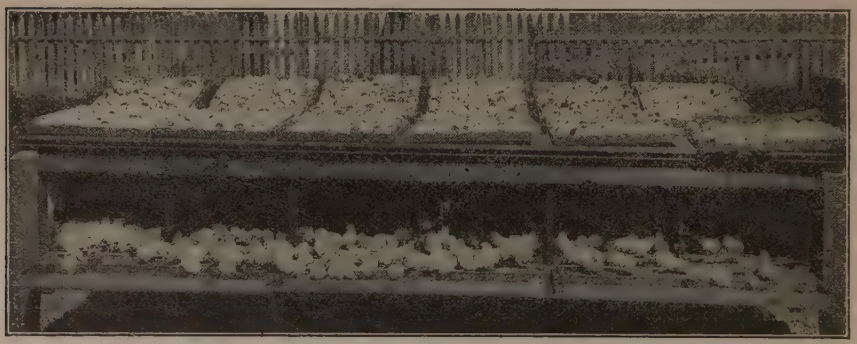


FIG. 582.

Little chickens — "Just out!" — Hatched in an incubator. This shows them in the brooder, their foster mother; their empty shells are in the trays above.

care of them, you will soon have fresh eggs of your own for breakfast, and perhaps an account of your own in the bank. At any rate, you will be learning something worth knowing about the most general and one of the most important industries of the state.

In the Great Valley Region and in the large valleys of Southern California the chief agriculture of the past has been the growing of grain (Fig. 583) and live stock: wheat (Fig. 141) and barley, horses, (Fig. 584), cattle, and sheep (Fig. 585). The land was owned in large ranches (Figs. 586, 587), from a thousand acres or less to a hundred thousand acres or more in each, often so large that it was a day's journey to ride over one of them. The stock was turned loose to shift for itself on the range; the grain land was lightly scratched on the surface by gang plows, and depended upon the scanty rains for the crop. This was called "dry ranching." Under this system California became one of the great wheat regions of the world, shipping wheat and flour everywhere. But the poor cultivation and the continual repetition of the same crop exhausted the soil, and a change became necessary. The "dry ranch" system is changing to intensive farming or diversified farming. This requires the breaking up of the great land grants into small holdings, the practice of irrigation, and a much denser population. Vegetables, alfalfa, pumpkins (Fig. 588), hogs, milch cows, poultry, berries, fruits, beans (Fig. 589), sugar beets (Fig. 590), take the place of the dry grain fields and bare ranges of the old system.

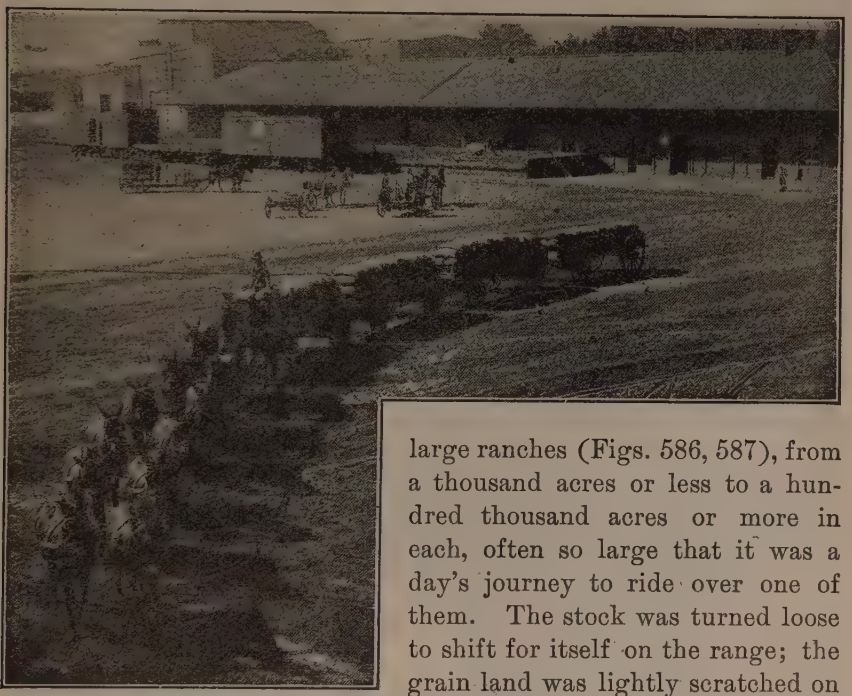


FIG. 583.

Hauling the grain to market. Four wagons, about 250 sacks of grain. One man driving with "jerk line" a twelve mule team. What else do you see in the picture?

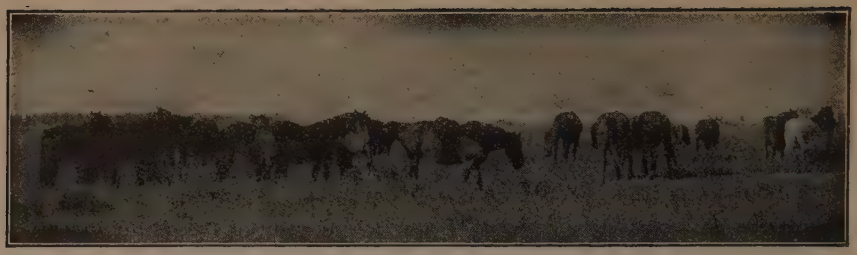


FIG. 584.

A bunch of fine horses feeding in alfalfa pasture.

FIG. 585.

Sheep with their lambs in a valley pasture.

FIG. 586.

One of the largest ranches of Southern California, growing beans, hay, and grain. Notice the beautiful country home, supplied with electric lights, gas, telephone, and all modern conveniences, large grassy lawn, flowers, and shrubbery about the house; large fields of beans in the distance.

FIG. 587.

Teams of a large ranch about to leave for work in the fields. The foreman of the ranch in the wagon in the foreground; barns, blacksmith shop, tool house, on the left; ranch house in the distance; wagon and implement shed on the right. Notice how clean the barnyard is kept and everything in order. The men have good clean quarters and are fed the best the market affords. The horses and other stock are well fed and handled with great kindness and care. Some of the finest work horses in the state are on this ranch. To abuse or neglect any of the stock means loss of position. Why is kindness to stock demanded?

This means greater opportunities for the farmer. For any one who will mix brains with his work, the intensive small farming of these great valleys offers rich rewards. Twenty acres of good land well irrigated and well managed will keep a family and make it prosperous. On many and many a little farm the owner clears a hundred dollars per acre each year. There are vast areas of land yet to be irrigated, divided into small tracts, and made into homes. The future wealth and prosperity of our state will largely depend upon the fruits of these irrigated farms in the interior valleys. Here is a great

FIG. 588.
"Some pumpkins" in California.

chance for boys and girls who will learn how to take it. It offers a much safer, happier, and more independent life than a hand-to-mouth

FIG. 589.

Thrashing beans in Ventura County. The lima bean is grown almost exclusively in Southern California. Hundreds of carloads are shipped to eastern markets each year.

existence on an uncertain salary in a town or city. These small farms and denser population make possible all the comforts and conveniences of life, and bring increased social advantages. They

FIG. 590.

Harvesting sugar beets. After the beets are removed, cattle or sheep are turned into the field to feed upon the beet tops. After the beets are run through a beet-sugar factory (Fig. 146), and the sugar extracted, the pulp of the beet is put into silos and fed to stock.

bring well-built houses, modern plumbing, electric lighting, free rural mail delivery, telephones, trolley cars, daily baker and butcher wagons, trim lawns, fine roads, good schools. With all this is the

pure air, the bright sunshine, and the wholesome labor of the country. Does it not look attractive when compared to the crowded, unhealthy, and anxious lives of most people in the cities?

QUESTIONS

(1) How are the cities dependent on the farms? How is the opposite of this true? (2) Why did the early settlers think the soil worthless? How has this belief been refuted? (3) Give in your own words the word picture in the text. (4) For what is Petaluma famous? (5) Describe a chicken ranch. (6) What was the chief agriculture of the Valley Region in the past? (7) Why did it have to change? What is it now? (8) Compare city with country life.

Fruit Growing

The greatest development of intensive farming has been and will continue to be in the growing of fruits (Fig. 591). This industry

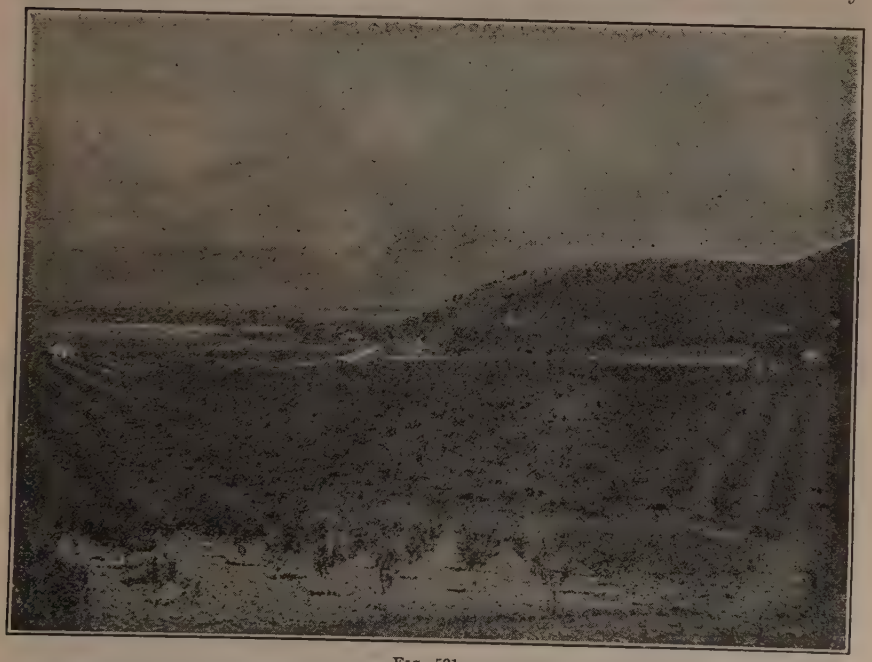


Fig. 591.
Looking across Santa Clara Valley; famous for its fruits, beautiful homes, and fertile soil.

requires brains and education, and it yields rich rewards. No other state can here compete with California.

FIG. 592.

Hemet Dam, in the San Jacinto Mountains. Thus the winter rains and snows in the mountains may be stored and used in summer to raise orchards and vineyards in the thirsty valleys far below.

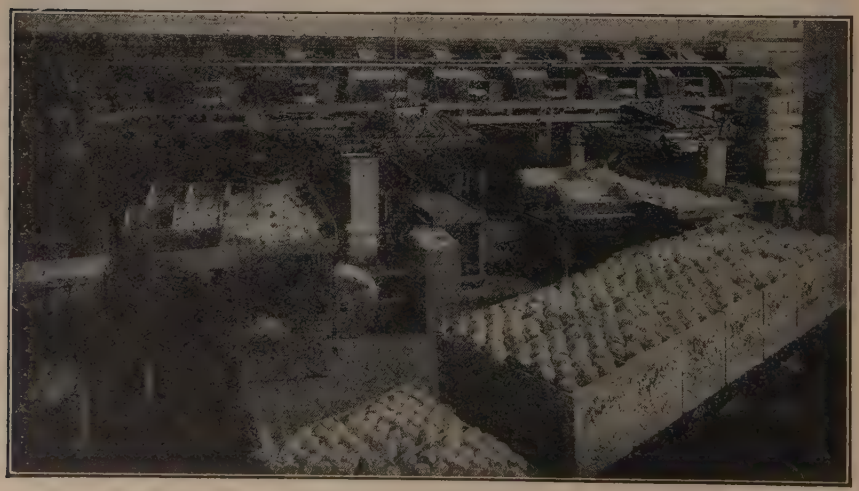


FIG. 593.

Wrapping oranges by machinery and packing them in boxes for shipment.

Wherever we go, north, south, east, west, up into Canada or down into Mexico, we find California fruits in the market. They are larger and handsomer and earlier than any others.

Most important of all are the citrus fruits, the orange, lemon, lime, and pomelo or grape fruit. The center of the orange industry is Riverside County (Fig. 592), which ships over 6000 carloads yearly. San Bernardino (Fig. 572) and Los Angeles counties also ship thousands of carloads. Each car holds about 300 boxes and each box over 100 oranges. The finest orange is called the Washington Navel. Thousands of people are engaged in raising it, and other thousands are packing it (Fig. 593) and selling it. It makes the chief industry of Southern California. It is a splendid fruit, large, high colored, sweet, and juicy, with a delicious flavor. Moreover, it is entirely seedless and is so firm and strong that it stands shipment for thousands of miles. Important as it is now, it was discovered almost by accident. Over thirty-five years ago Mrs. Tibbetts wrote to the Department of Agriculture at Washington asking for some trees that would probably grow well in her garden in the little new settlement. It happened that the Department had on hand half a dozen orange trees that had been sent up from Bahia in Brazil, wrapped in wet moss. Two of them had died, but the other four were sent to Mrs. Tibbetts. She planted them, but one died from lack of water, and another was eaten up by a cow. The two remaining struggled along for several years until they bore some fruit. Immediately the oranges attracted attention, so handsome they were, so delicious, so free from seed, so firm for shipping. From

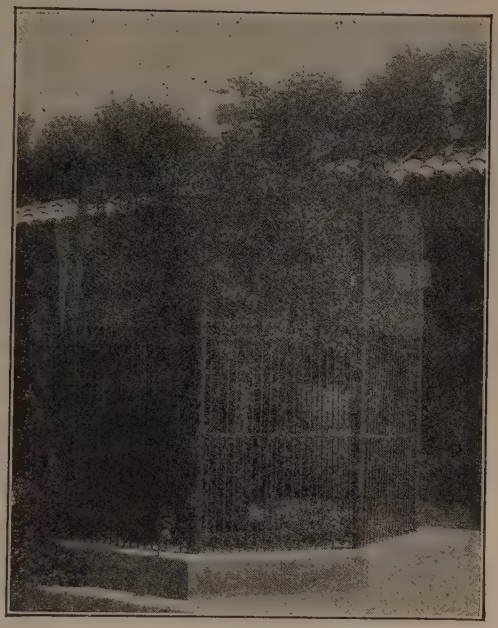


FIG. 594.

One of the original navel orange trees brought from Brazil in 1873. It was transplanted to the courtyard of the Glenwood Tavern at Riverside by President Roosevelt in 1903.

these two trees came all the navel oranges in California. The parent trees (Fig. 594) are still alive, carefully attended and protected by

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FIG. 595.

Luther Burbank and a bit of his experimental garden, Santa Rosa, showing one of his wonderful creations, spineless cactus.

iron bars. They still bear abundant fruit, and may be seen by visitors. In the immediate neighborhood are twenty million dollars'

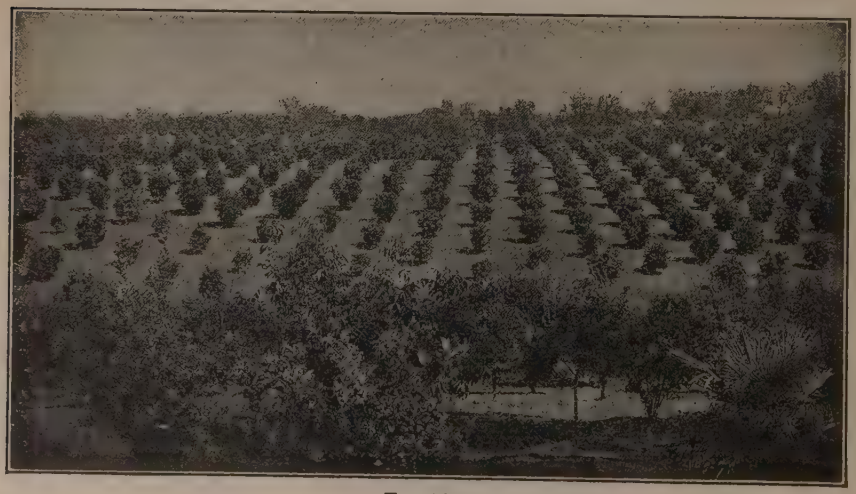


FIG. 596.

An orange grove at Fair Oaks, Sacramento County.

worth of navel orange groves (Figs. 572, 573). What great results have come from this small beginning! It makes us wonder if there

FIG. 597.

The Limoneira Ranch, Ventura County. 350 acres in lemon trees in full bearing; 575 acres in walnuts; the reservoir in the foreground and the packing house and barns in the distance.

are not other fruits and food plants in far-off corners of the earth that would be of great value here.

FIG. 598.

Lemon picking, Limoneira Ranch.

FIG. 599.

Interior of packing house, showing process of packing lemons for market, Limoneira Ranch.

FIG. 600.

A prune orchard in bloom, Sonoma County.

Luther Burbank (Fig. 595), one of the most famous men of the world, has added much to the pleasure, comfort, and profit of the world by his new creations of flowers, fruit, and vegetables, such as the Shasta daisy, the spineless cactus, and the Burbank potato. We may well be proud of the fact that Luther Burbank is a Californian and that his great work has all been done at his home in our own state. One of the large schools (Fig. 625) in Santa Rosa, his home town, is named the Burbank School. He is always interested in schools and children.

Fig. 601.
Flaming Tokay table grapes, Sacramento County.

It is not alone in the south that oranges are grown. One tenth of the citrus fruits are grown in Central and Northern California. In Tulare County is a fine orange section, where the fruit ripens earlier than in Southern California. Near Sacramento (Fig. 596), and at Oroville too, oranges are successfully grown, and even as far north as Chico.

Fig. 602.
Hops at their full growth.

Lemons are second of the citrus fruits in importance, and they are grown in the same localities as oranges (Fig. 597). They can be picked (Fig. 598) every month in the year, and it is common to find ripe fruit, green fruit, and

blossoms on the trees at the same time. The yearly output (Fig. 599) is about 5000 carloads. Almonds and walnuts are grown extensively in various parts of the state. The deciduous fruits, that is, those whose trees shed their leaves in winter, are nearly all grown in Central and Northern California.

Fig. 603.

Greystone winery, Napa County. Said to be the largest winery in the world.

Many places have become famous for certain fruits. Thus Fresno for raisins (Fig. 145); San José and Santa Rosa for prunes (Fig. 600); Watsonville and Salinas for apples; San Joaquin and Tulare for table grapes (Fig. 601); Sacramento for

Fig. 604.

Drying prunes, San Joaquin Valley.

strawberries, table grapes, and hops (Fig. 602); Santa Rosa and Napa for wine grapes (Fig. 603); Vacaville for cherries. Fresno sends out 2000 carloads of raisins per year, enough to supply a pound box to

every boy and girl, man and woman, in the United States. There are 3000 carloads of dried prunes (Fig. 604) shipped every year all

FIG. 605.

An avenue in the Sylmar olive grove, Los Angeles County.

over the United States. The Hume prune orchard in the Santa Clara Valley has 300,000 trees. Dried peaches, pears, and apricots

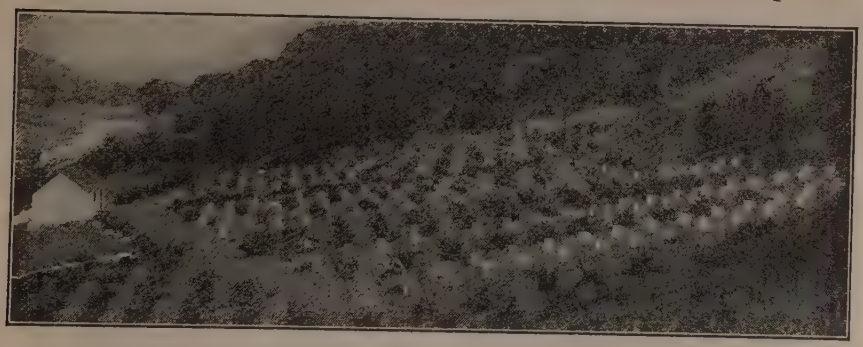


FIG. 606.

An apiary in the foothills of Southern California. The bees gather honey from the neighboring orchards, bean fields, and mountain shrubbery. Sage and wild buckwheat are considered the best honey plants. The bees of California gather about four thousand tons of honey per year. Each hive is called a colony. The bee industry is a very interesting study. Look it up and learn what you can about it.

are important exports. Olive culture (Fig. 605) is one of the oldest fruit industries of the state. San Diego leads in the produc-

tion of olives and olive oil, although there are large orchards in various other counties, and every year adds to the number of trees. While honey is produced in all of the principal valleys, the great supply for the market comes from the southern part of the state (Fig. 606). Each of these industries affords material for study, inquiry, and travel. It is real geography work for girls and boys to find out about these interesting things for themselves.

QUESTIONS

(1) What is the most important class of fruits in California? (2) For what is Riverside County famous? (3) Tell the story of the parent orange tree. (4) In what other parts of the state are oranges grown? (5) How are new trees started if the orange has no seed? (6) Describe the lemon industry. (7) Find out all you can about Luther Burbank. (8) What are deciduous fruits, and where are they grown? How do the trees differ from citrus fruit trees? (9) Mention several towns famous for certain kinds of fruit. (10) Tell of the raisin and prune crops. (11) Which county leads in the production of olives and olive oil? (12) Tell what you can of the honey industry.

Forests and Lumber

One of the greatest of the resources of the state is the forest and its lumber, obtained from the redwoods of the Coast and the pines of the Sierras. Our methods of lumbering are wasteful and extravagant. After the trees are felled, the whole country is often burned over (opp. p. 575), to get rid of the bark on the logs, the saplings, and all undergrowth, so as to get the logs more easily to mill. At the mill (Fig. 608) a great fire burns, night and day, to get rid of the waste lumber, the slabs, blocks, and short pieces that are only in the way. Some of these fires have burned constantly for twenty or thirty years. Think of the mountains of fuel they have destroyed. This waste lumber is not salable just now, and it would not pay to ship it to market; but later, when it will be valuable and sorely needed by the people, it cannot be recovered.

One of the things our rich and extravagant country must learn to do is to care for and rightly use its resources and not allow them to be squandered. If we don't wish to wake up too late and find our forests all gone, we must find ways to compel them to be used slowly and carefully, so as to let the young trees continually take the place of the old ones as they are cut down. The forest policy of our government is one of the things that all young Americans ought to watch and think about. There will be useful work for many boys

FIG. 607.
Cone oak grove, near Red Bluff, Tehama County.

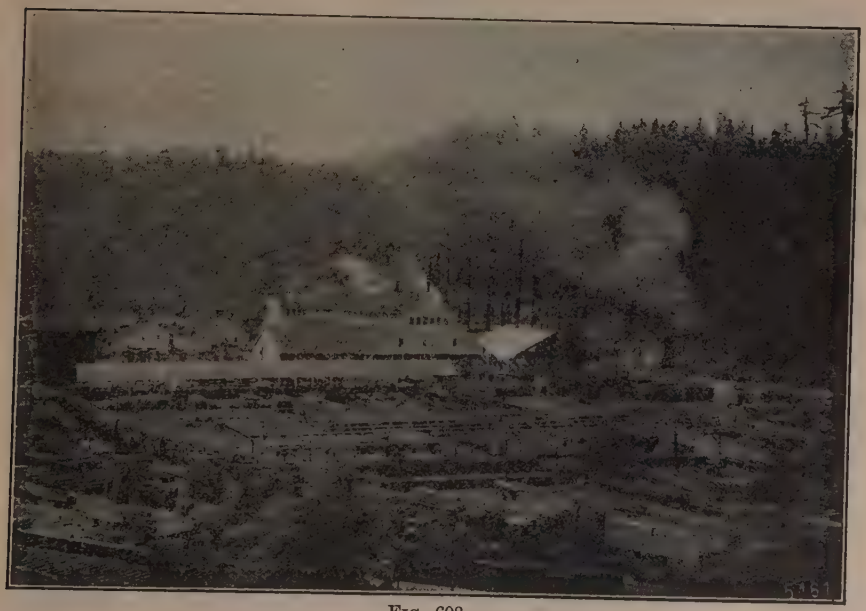


FIG. 608.
Mill of the Pacific Lumber Company at Scotia, Humboldt County. Usual output, 200,000 ft per day.

as foresters and rangers (Fig. 554), in the future, so it is worth looking up.

The redwood forests grow down near the level of the sea, reaching back into the lower slopes and river valleys of the outer Coast Range. They originally extended from Monterey County northward into Oregon, but those of the central coast are nearly all gone. One splendid grove, Big Basin (Fig. 609), in Santa Cruz County, still remains. It was bought from private ownership by the state, and is set apart as a public park for our people and our visitors to look at and enjoy while they camp out or travel about to recreate themselves with natural scenery and outdoor air. The trees in this park are very tempting to lumber dealers, and the constant watchfulness of all good citizens is necessary if we would preserve the grove in the future. Remember this.

FIG. 609.
On the road to Governor's Camp, California Redwood Park.

The main part of the redwood forests, however, are now along the north coast, in Mendocino, Humboldt, and Del Norte counties. They are the wonder of the world. The vast trunks stand close together, towering like columns to the sky, 300 feet high, 10 to 20 feet in diameter, several thousand years old. The stagecoach rolls silently over the needle-strewn roads, and the passengers are awed by the solemn twilight under the great trees. Ferns and bushes cover all the ground beneath.

These forests have mostly passed from private owners into the possession of great lumber corporations. It is estimated that they will all be cut down in thirty years. The method is to chop down (Fig. 139) the trees or saw them down; then drag out the logs by

long wire cables (Fig. 140), extending through the forest, up hill and down dale, for a mile or more. The cable is pulled by a donkey engine. The logs are then loaded on railroad cars (Fig. 143) and hauled to the mills. The mills are often beside the salt water, so that the boards and shingles can pass directly from the saws to the ships that are waiting to carry lumber to the ends of the earth

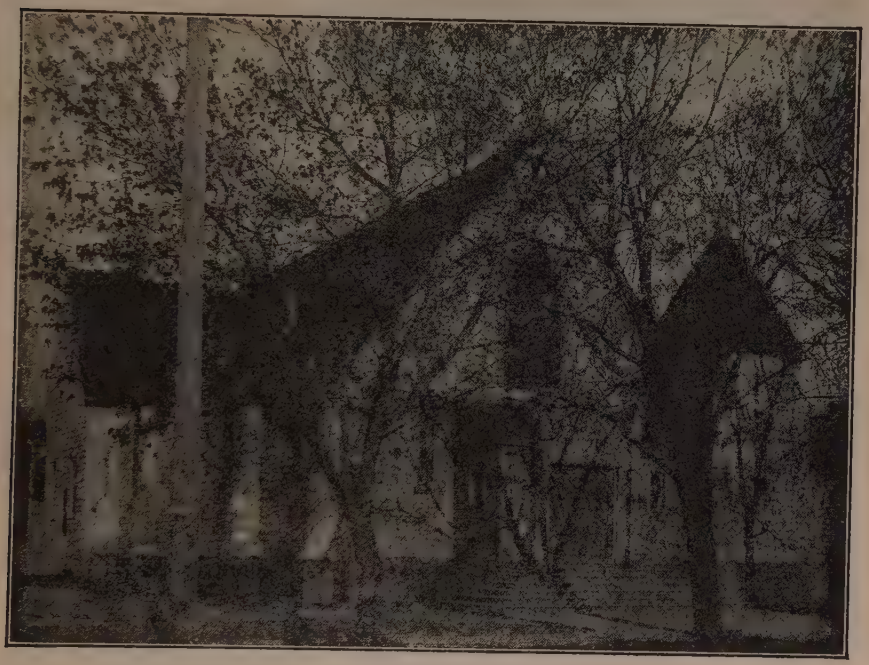


FIG. 610.

Baptist Church, Santa Rosa. Built with lumber from a single redwood tree.

and to the distant islands of the sea. Sometimes a single tree will make a whole train load (Fig. 143) of logs; sometimes the lumber from one tree will build a big church (Fig. 610).

The pine forests are more widely distributed than the redwoods (Fig. 152), covering the mountains in the higher Coast Ranges, the Sierras, and the few highest mountains of Southern California. The sugar pine is the most valuable tree, making fine, clear lumber for doors and window sashes. The yellow pine yields larger quantities than any other. Some fir and cedar is used, too. The methods of lumbering are similar to those of the redwoods, but when the lumber comes from the mills, it must be hauled down from the mountains

FIG. 611.

A view of a petrified giant of the forest — "stone dead." Forty-five acres of this large tract of forest near Santa Rosa is covered with petrified trees, some twenty-four feet in circumference and three hundred feet in length.

with teams, or sent down in great flumes carrying a swift stream of water. Then it is distributed to the whole country by the railroads. The lumber products rank second in the industries of the state. In Sonoma County is a petrified forest (Fig. 611) made up of trees which fell ages ago and have turned into stone. There are plenty of most interesting things suggested here to read about, hear stories about, or to go and see.

QUESTIONS

(1) Tell why the lumbering method is wasteful. (2) What kind of trees are found near the coast? Tell of the former extent of these forests. (3) Tell something of the Big Basin. (4) Describe the forests of the northern coast counties. (5) Describe the method of getting the logs from the forests. (6) Tell how the logs are made into lumber and the lumber delivered to market. (7) Where are the pine forests found? (8) Find out what you can of the petrified forest.

MINERAL PRODUCTS

There is a very great variety of mineral products found within the state (Fig. 612), more than fifty in number. Among the metals are gold, silver, copper, lead, quicksilver, iron, tin, antimony, platinum. Among building materials are granite, sandstone, marble, brick clay, slate, lime, cement, asphaltum, bituminous rock. Among the gem stones are tourmaline, opal, beryl, diamond, garnet, turquoise. Among the fuels are coal, natural gas, and petroleum. Gold is naturally the most important product, since California is known as the Golden State.

Dredger mining is a new and profitable way of extracting gold from the valleys at the base of the Sierras, along the streams from the Mother Lode. A great machine is built upon a scow (Fig. 613) which floats on an artificial pond of water fed by a ditch. This oper-

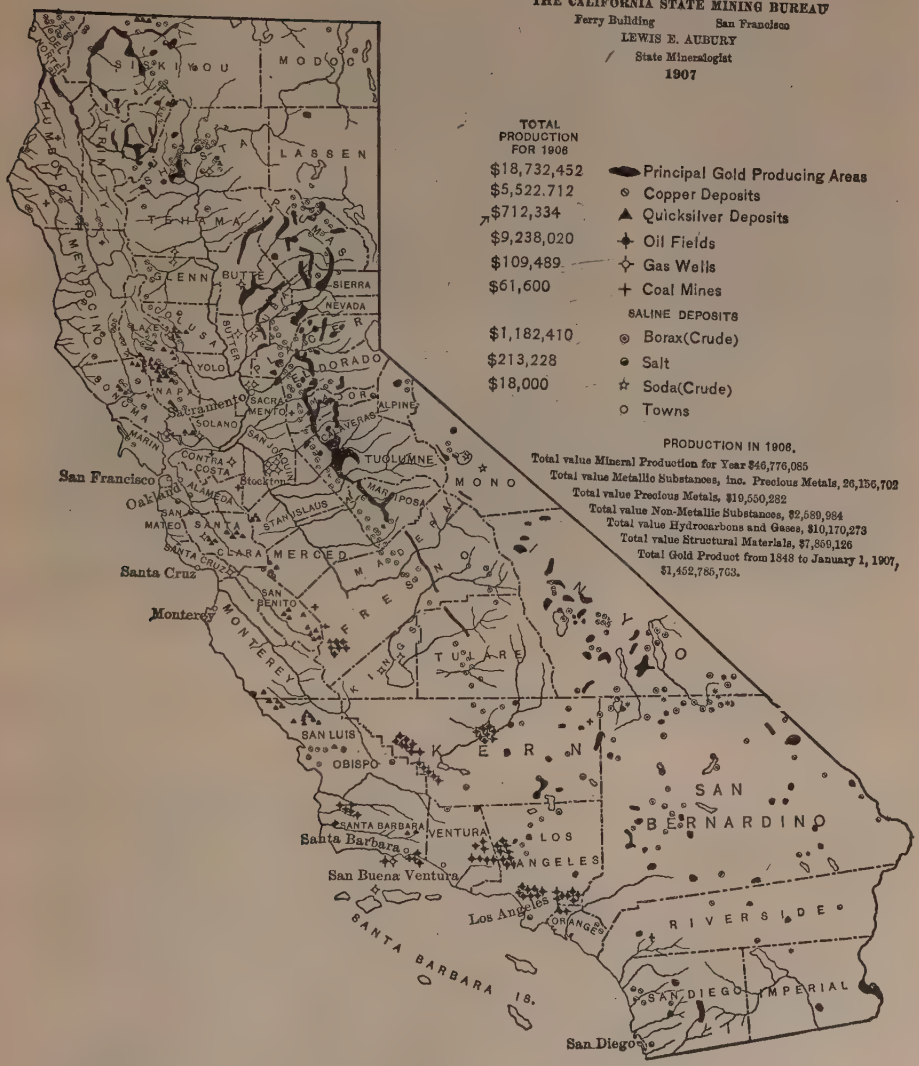

Mineral Map of California
Showing the Approximate Locations of all the Principal
MINERAL DEPOSITS
TOGETHER WITH
STATISTICS OF MINERAL PRODUCTION
ISSUED BY
THE CALIFORNIA STATE MINING BUREAU
Ferry Building San Francisco
LEWIS E. AUBURY
State Mineralogist
1907
TOTAL PRODUCTION FOR 1906
$18,732,452
$5,522.712
$712,334
$9,238,020
$109,489
$61,600
Principal Gold Producing Areas
Copper Deposits
Quicksilver Deposits
Oil Fields
Gas Wells
Coal Mines
SALINE DEPOSITS
$1,182,410
$213,228
$18,000
Borax(Crude)
Salt
Soda(Crude)
Towns
PRODUCTION IN 1906.
Total value Mineral Production for Year $46,776,085
Total value Metallic Substances, inc. Precious Metals, 26,156,702
Total value Precious Metals, $19,550,282
Total value Non-Metallic Substances, $2,589,984
Total value Hydrocarbons and Gases, $10,170,273
Total value Structural Materials, $7,869,126
Total Gold Product from 1848 to January 1, 1907, $1,452,785,763.
SISKIYOU
MODOC
LASSEN
TEHAMA
GLENN
BUTTE
SIERRA
NEVADA
PLUMAS
LAKE
YOLO
EL DORADO
NAPA
SACRAMENTO
ALPINE
SOLANO
SAN JOAQUIN
CONTRA COSTA
TUOLUMNE
MONO
San Francisco
Oakland
ALAMEDA
Stockton
MARIPOSA
SAN MATEO
SANTA CLARA
STANISLAUS
MERCED
Santa Cruz
SAN BENITO
Monterey
MONTEREY
FRESNO
KINGS
TULARE
KERN
SAN LUIS OBISPO
SANTA BARBARA
Santa Barbara
VENTURA
San Buena Ventura
LOS ANGELES
Los Angeles
ORANGE
SAN BERNARDINO
RIVERSIDE
SAN DIEGO
IMPERIAL
San Diego
SANTA BARBARA IS.

FIG. 612.

ates a chain of heavy iron buckets which bring up the sand, rocks, and gravel from below even to a depth of sixty feet, scraping the solid bed rock below the gravels. The buckets empty their load upon the scow, where the gold is washed out in sluices, the same as with the gravel in ordinary placer mining. The rocks, from as big as your fist up to the size of a tub, are dumped aside by the dredger; the sand and soil settles down in the pond and is covered deeply by the rocks, perhaps changing a farm or vineyard into a desolate waste of bare stones. The dredger with its pond advances slowly as it works, eating up the country as it goes. The business is so profitable that

FIG. 613.

A dredger on the Feather River near Oroville mining for gold. One of these modern gold dredgers costs from $150,000 to $200,000 to build. As there are many of these machines at work in the northern part of the state, a large amount of gold must be produced to warrant the expenditure of so large a sum of money in building machinery to handle it.

the dredger men can afford to pay enormous prices for the orchards and fields that are underlain by rich gravels. Fortunes are often made, and many men are given work for a time; but the country worked over is destroyed. No longer will it support people or keep up the strength of the state. We must protect our soil, for that is what our country is made of. We must in future have this work done so that the fertile soil is left above, the barren rocks below, even if the profits are not so sudden or so large.

Copper (Fig. 614) is smelted from its ores in Shasta County, where there are the largest and most important mining works in the state. Iron ore is found in many places, but the lack of suitable fuel has thus far prevented the building of iron works. Lead and silver

occur in the mountains of the desert region in Inyo County. Quicksilver is found in the Coast Ranges, in Napa, Santa Clara, San Luis Obispo, and San Benito counties. No other state in the Union approaches California's output of this metal. Brick clay, marble, granite, and lime are well distributed all over the state. Asphaltum and its derivative, bituminous rock, are found in the mountains near

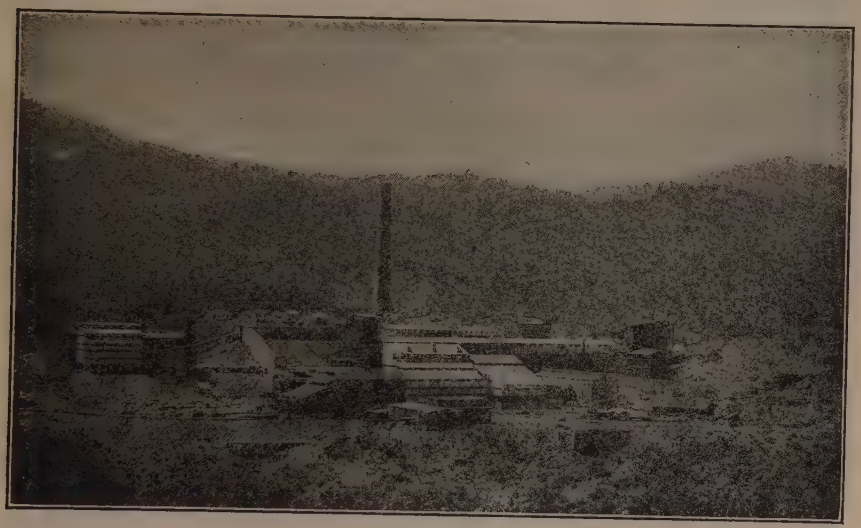


FIG. 614.

Copper smelter at Coram, Shasta County. Capacity, 1800 tons per day. There is blocked out at the present time in the Shasta County copper ore fields alone, two hundred and fifty million dollars' worth of ore.

the coast in Southern California, associated with the petroleum fields. Bituminous rock is a sandstone saturated with asphaltum used in paving and road building.

In San Diego and Riverside counties are mines of beautiful crystals, called gem stones. They are hard and brittle, difficult to cut and polish; but their colors are so exquisite, their luster so brilliant, that they are very valuable as jewels. Tourmalines are of green and red tints; beryls of greenish shades; kunzite is a recently discovered stone named for Mr. Kunz, the gem expert at Tiffany's. It is of a delicate lilac and almost as brilliant as a diamond. Opals and turquoise are found in the deserts of San Bernardino County. Diamonds are found in the gravels of Butte County.

A rather poor variety of coal, called lignite, is found about the base of Mt. Diablo, and also in the coast mountains of Southern California. Some bituminous coal is found in Monterey County.

The lack of good coal and the expense of bringing it from foreign places by ship or rail has prevented the development of manufactures in the state. This lack, however, is being made up by the discovery and development of great oil fields, in Fresno, Kern (Fig. 615), Los Angeles, Santa Barbara, and Ventura counties. The invention of oil-burning locomotives, furnaces, and stoves makes fuel oil one of the great staples of the Coast. Pipe lines bring the oil to the seashore, whence it is shipped to foreign and domestic ports;

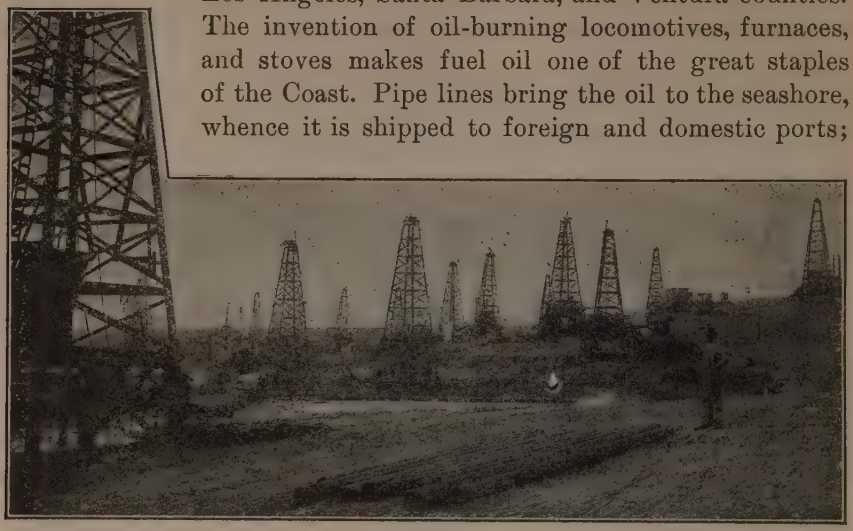


FIG. 615.

A view of a portion of Kern County's great oil fields which extend for miles along Kern River. There are many hundreds of oil derricks such as appear above, and great storage tanks built of earth containing thousands of gallons of the crude, black oil pumped from the wells; oil is loaded into tank cars by gravity for shipment, while the waste product runs into "sump" holes and is burned.

or perhaps it is refined before shipping. A great pipe line leads from the Kern County oil fields nearly 300 miles to Point Richmond on San Francisco Bay, where the refineries (Fig. 616) of the Standard Oil Company are located. By refining crude oil is meant its separation by distilling into its constituent parts, such as asphaltum, paraffin, gasoline, benzine, naphtha, kerosene, distillate, lubricating oils, etc. Petroleum is second only to gold in value of mineral products, and doubtless it will soon take first place. It is of enormous value to the state already, although we have hardly begun to know how to use it or appreciate it as yet. It is a much cheaper and more convenient source of power than coal. It is estimated that the Southern Pacific Railroad alone saves over five million dollars per year by changing from coal-burning to oil-burning locomotives; and that our oil fields keep within the

state over thirty million dollars per year that was formerly sent away for coal. The oil wells average about a thousand feet in depth, and cost from $5000 to $10,000 each. The California oil in most cases must be pumped out, as it is a thick, black, heavy fluid, about one third of it asphaltum; although there are several flowing wells, for example the Hartnell Gusher, Santa Barbara County, producing

FIG. 616.

A view of the Standard Oil Company's refinery at Point Richmond. Notice the oil tanks, stills, smokestacks — indicating business activity and commercial life. Here is where the crude oil is refined and its various constituent parts made ready for market.

from 3000 to 5000 barrels a day, while other wells yield from 5 to 200 barrels per day, every day in the year. The selling price has been very low, about thirty-five cents a barrel, for the reason that California was not prepared to use the immense quantities that were suddenly produced upon the discovery of the Kern River oil fields. This led to discouragements, losses, and great wastes of this valuable natural resource. Because of its cheapness it has been largely used to sprinkle the dust of streets and roads in many places. It is too precious to the world to be long used in that way, however. This oil is another of the things belonging to the people of the state that true patriotism demands of us to protect and use wisely. There is

employment and prosperity bottled up in it for the boys and girls who read this, and for those of future generations. To pump it out of its underground reservoirs before it is needed, to waste it and sell it for a song, is wanton extravagance with what really does not belong to us, but to our descendants.

Natural gas often occurs in the oil wells and elsewhere. It is piped into furnaces or stoves, and makes the most desirable fuel that the world has ever seen. It should not be used for burning bricks or other manufacturing purposes, but saved for household use. Artificial gas in California is manufactured almost entirely from petroleum. In other states it is usually made from coal.

Salt (Fig. 565), borax, niter, and soda (Fig. 566) have been mentioned as occurring in the muddy bottoms of desert sinks. When transportation from the desert regions becomes better and cheaper, niter will become a highly important product. It is needed in making explosives and fertilizers. Our growing orchards will continue to need fertilizers, and the niter beds that make the chief wealth of Chili are said to be nearing exhaustion. Our country sends away millions of dollars every year for Chilian niter. There is a point here for ambitious boys to ponder upon. Salt is also extracted from sea water by evaporation at San Francisco and San Diego. The water is let into broad, shallow ponds, and evaporated in the heat of the sun.

QUESTIONS

(1) Name some of the metals and building materials of the state. (2) Describe dredger mining. What effect has it on the land mined? (3) Tell of the copper industry; iron; quicksilver; marble; asphaltum. For what is each used? (4) Where are gem stones found? Mention the principal kinds. (5) Where are the oil fields? Describe an oil well. (6) What is meant by refining crude oil? (7) What is natural gas, and what use is made of it?

Manufacturing

In the past, California has been held back in manufacturing because fuel in the form of coal had to be shipped in, and was expensive. Things are different now. The petroleum of our oil wells (Fig. 615) is being used in great quantities as fuel to make steam for the engines that turn the wheels of hundreds of new factories. Besides, the water power (Fig. 549) of the Sierran streams is used to generate electricity, which is taken by long lines of wires, up and down and across our state, wherever it may be needed to run machinery. Many of our factories are busy preparing the products

of our farms for market. Flour mills (Fig. 617), wineries (Fig. 603), canneries, creameries, and olive-oil factories turn out products of which we may be proud. Our sugar refineries and beet-sugar factories (Fig. 618) are increasing in number and importance. Great smelters are at work purifying the gold, silver, copper (Fig. 614), and lead taken from the mines. We have tanneries making leather out of the hides of our cattle, and woolen mills using the wool of our great flocks of sheep. Cement works, potteries, and brickyards supply their share of material for our growing cities. Foundries, ship-building yards, and factories for making mining machinery have become important. Powder works and match factories are found. Most of these factories,

FIG. 617.
U. S. Army Transport *Logan* loading flour at South Vallejo.

FIG. 618.
Hauling beets to the beet sugar factory, Hamilton, Glenn County.

especially the larger ones, are situated in the San Francisco Bay region. It is of great value to any factory to have a water route right in front of it. That means that it can get its raw material and send out its finished products in ships (Fig. 618), and ships do not charge as much for carrying freight as the railroads do.

There is a good future for manufacturing in this state. We have plenty of good, cheap power; the state is building up, and our home demand for factory products is getting larger every day. Across the great Pacific are new lands swarming with people who are beginning to buy manufactured goods from us; and before long the Panama Canal will give our products a cheap and easy route to the eastern part of our country and to all the countries of Europe. Many a boy and girl who reads this will see the day when there will be a dozen factories in California for every one that is here now.

QUESTIONS

(1) Why is California not a manufacturing state? (2) What tends to foster great manufacturing interests? (3) What are smelters? tanneries? potteries? foundries? woolen mills? (4) Where are most of the factories situated? Why? (5) What do you think of the future of manufacturing in California? (6) How will the Panama Canal benefit California?

Transportation

The wagon roads and railways follow geographical lines, running northwest and southeast along the great valleys and between the long mountain chains; with but few cross ways leading from the

Fig. 619.
The "Overland Limited" leaving Sixteenth Street Station, Oakland; U. S. battleship in the distance.

coast to the great valleys and from the great valleys to the desert regions. The Southern Pacific Railroad (Fig. 619) runs the entire

length of the state through the Great Valley Region, from Oregon to the southern end of the state. It has a parallel line through the Coast Region from San Francisco to Los Angeles, and many branches leading into the side valleys. From Los Angeles it runs easterly through the desert, headed for New Orleans; in the north it extends to Portland, Oregon; in the center, its traffic goes east, *via* the Central Pacific, over the Sierras (Fig. 563), through Ogden, and on to

FIG. 620.
U. S. Army transport *Sheridan*, bound for the Orient.

Chicago and New York. It has more than 3000 miles within the state of California.

The Santa Fé Railroad reaches from San Francisco via Point Richmond down the Great Valley, over the Tehachapi Pass, across the Mojave Desert and on to the east, leaving the state by crossing the Colorado River at Needles. From the desert station of Barstow, a branch extends into the southern counties by the Cajon Pass, going through San Bernardino to Los Angeles, and on down the coast to San Diego.

The Salt Lake Road extends from Los Angeles to Salt Lake, Utah, by way of the Cajon Pass and the Mojave Desert.

The Western Pacific is a new transcontinental road coming into the state across the deserts of Nevada, over the Sierras through the Beckwith Pass, and down the Sacramento Valley, making ferry connections at Oakland for San Francisco.

The California Northwestern Railroad extends from San Fran-

cisco northward through the valleys of the Coast Ranges, headed for Humboldt Bay and the coast of Oregon.

A great development of transportation by electric railroads may be expected in the future. Already the more closely settled regions are gridironed by trolley lines (Fig. 551), some a hundred miles long; and these will be multiplied and extended until the fertile part of the state becomes a perfect network. The mountain streams come down steep slopes near the wide valleys, with their growing cities. Thus the conditions are just right for a wonderful development of electric power, giving employment to thousands of engineers and electricians who are now little boys in school.

On the ocean there is great traffic by steamers (Fig. 620) and sailing vessels up and down the coast and with foreign ports as well. The steamship lines radiating from San Francisco, the swarms of boats and ships that ply in and out of the smaller harbors along the shore all the way from Crescent City to San Diego, the river crafts (Fig. 621) that go up and down the streams emptying into San Francisco Bay, the wheat ships, the lumber vessels, the army transports, the men-of-war, all these fill the waters of California with life and motion (Fig. 525) and make for the greatness of the state. All these must be dismissed here with only the brief hint that our shipping is full of interest for all children, and will yield many a fascinating story.

FIG. 621.

A passenger and freight steamer on the Sacramento River, plying between Sacramento and San Francisco.

QUESTIONS

(1) In what direction do most of the railroads run? Why? (2) What two long parallel lines has the Southern Pacific in California? (3) By what two routes could you go east by the Southern Pacific? (4) Suppose you were going to New York. Describe your trip and the California cities you would pass through if you went by the Santa Fé; by the Salt Lake; by the Western Pacific. (5) How are the rural districts being brought into close relations with commercial centers? (6) What important means of transportation other than the railroads is there in this state? (7) Tell something of the traffic in and out of the Golden Gate.

Earthquakes

Once our old earth was much hotter on its surface than it is now. It is still very hot inside. This is shown to us by the hot springs (Fig. 151), the volcanoes, with their streams of lava, and the high temperature found in the bottom of deep mines. Slowly, through the centuries, it has been and still is cooling off. As it cools, it contracts, just as a hot wagon tire shrinks a little in cooling off after the blacksmith has placed it on the wheel and poured cold water over it.

The Pacific Coast is a line of weakness in the earth. Mountains are growing here. Here the high mountains are near the deep sea. Here are many long lines of fracture in the earth, running parallel to our mountain ranges. As the earth contracts, its outer rocks wrinkle like the skin of a shriveled apple. These wrinkles are our mountain ranges. As they are straining under the fearful pressure put upon them by the contracting earth, they frequently break, one edge of the break slipping up, the other down. This breaking and grinding of the rocky edges against each other, as they slip, makes the shock and trembling of the ground that we know as earthquake. If a great city happens to be near the break, great damage results; particularly if the houses of the city are badly built or built on poor foundations, or built with tall towers and chimneys that are readily shaken down. The earthquake of 1906 was a further slipping of an old break up and down the state along the coast range that has been known for many years. It is some 700 miles long, one of the longest in the world, reaching from Mendocino County to the deserts of Southern California. The earthquake of 1872 in Inyo County was much more severe than that of San Francisco, but being in a sparsely settled country, little danger to mankind was possible. The same may be said of other earthquakes in the past.

We should understand the fact that earthquakes are quite as natural as rainstorms or north winds. They are the means by which our mountains grow, but they come so infrequently that they surprise and frighten us. There is nothing in them to excite unreasoning terror for they do not destroy nearly as many people as whooping cough or other common illness; are not nearly so costly to human life as baseball or football; and those things do not frighten us. We should regard earthquakes as a natural phenomenon, and should

build for them, guarding against them as we do against rain and wind. It is reasonable to suppose that the future will again see both earthquake and volcanic activity within our borders.

QUESTIONS

(1) Why does the earth contract? (2) Why must we expect earthquakes on the Pacific Coast? (3) What causes an earthquake? (4) How does the loss of life by earthquake compare with that by athletic sports?

History

Since we have a good history of the state in the text-books on United States History, it will not be necessary to go into the matter here, further than to point out a few historic facts directly connected with our geography.

A very striking fact is that California was so far behind the rest of the continent in being accurately known to the civilized nations of the world and in being settled by European peoples. The coast was touched by the ships of Cabrillo and Drake shortly before 1550; but after that the region seemed to have been forgotten. It lay for a century and a half — four or five generations — unsettled, unvisited, unknown. Virginia had been settled a hundred and fifty years before an American ship ever came to California. Even as late as the Revolutionary War the densest ignorance prevailed. It was supposed to be an island, or a peninsula extending all the way from Mexico to British Columbia. The old maps seem queer creations as we look at them now. At last the Spaniards who had settled in Mexico sent some colonies up into California to convert the Indians (Fig. 622) and secure the country for Spain. The first settlement was made at San Diego, our nearest

Fig. 622.
Type of California Indians, fast passing away.

FIG. 623. — HISTORICAL BUILDINGS.

1. Sutter's Fort, Sacramento. 2. Colton Hall, Monterey. The first capitol of the state. 3. The old U. S. customhouse, Monterey.

city to the Mexican boundary, in 1769. Other Mexican-Spanish expeditions felt their way with uncertainty up the coast. One undertook to find the great bay of Monterey (Fig. 531), but missed it altogether and discovered San Francisco Bay (Fig. 526), instead. Drake himself, over two hundred years before, sailed right past San Francisco Bay, never even dreaming of its existence, while he stayed at a small and inferior anchorage only a little way to the north.

This belated exploration and settlement, this ignorance and uncertainty, grew directly out of geographical conditions. The country was cut off from the rest of the continent by vast deserts and snowy mountain ranges across which no man at that time had passed. Moreover, the coast was stern and rockbound, with few safe anchorages for ships, and with no base of supplies on that side of the world.

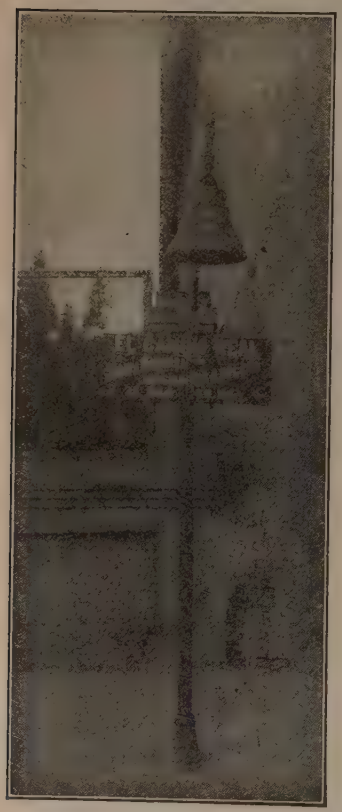


FIG. 624.
One of the many Mission Bells that mark the way of "El Camino Real."

The early settlements, too (Fig. 623), were determined by geographic conditions. When the Spanish padres selected the sites for their chain of twenty-one missions up and down the state, they showed great sagacity. Their locations were the fairest and the richest in the state, and the wisdom of their choice shows forth to-day. A road connecting these missions was built by the Mission Fathers. The name given the road was "El Camino Real" (Fig. 624), which is now being restored. Where are our large cities, our rich valleys? San Francisco, Los Angeles, Santa Barbara, San Diego, Sonoma, Santa Clara, San Buenaventura, — these were all started by the Mission Fathers.

Later historic events were also shaped by the geography of the state. The wonderful tide of immigration that began in 1849 (Fig. 547), that brought 100,000 men in a year or two, and that resulted in

the admission of the full-fledged state in 1850, grew directly from the fact that the streams of the Sierras had washed out gold from the quartz seams of the Mother Lode, and deposited it in the gravels of the foothill counties. Every city in this state grew up for some geographic reason which would be interesting to trace. Our future as well as our past rests upon our geographical conditions, upon the way our country is built and how it is located. Our wealth, our future, are bound up in our long, rich valleys; in our streams of water from a long, snow-crowned mountain range; in our long shore line that controls the commerce of our continent with the Orient.

QUESTIONS

(1) Compare the settlement of California with that of the Eastern States, as to methods and time, giving reasons for the differences. (2) Why do you suppose San Francisco Bay was so long undiscovered? (3) Why did the early Spaniards come to California? (4) Name the sites of the early missions. If you have seen one, describe it. (5) What has become of the descendants of the early Indians? (6) How has the geography of the state affected its history?

EDUCATION

California affords good opportunity for education. Its school system consists of the following elements: —

First, the Public Schools with about fourteen thousand teachers and about thirty children for each teacher. Each of these thirties costs the taxpayers of the state about a thousand dollars per year. Our laws are exceedingly generous to the small and remote schools of the state, allowing $600 or more to every school district, no matter how small and no matter how little the tax that it pays. Some districts pay only $50 or less in school taxes in return for the $600 or more that they receive as school funds. The difference is made up by the taxes paid by the cities. The state pays these great sums of money so that all the children may learn to understand each other, learn to get along well together, grow into decent, intelligent citizens together. It is unfortunate for any one to fail to get the experience of our public schools, if he is to live in our country. The schools are intended to help all young people to learn to make an honest living in the world, to take an intelligent part in our government, to be useful to their fellow-citizens, and to be happy (Figs. 625–626).

Second, the Normal Schools where teachers are trained. These are supported by state taxation, and cost about $450,000 per year.

1

2

3

4

5

6

FIG. 625.—TYPICAL SCHOOL BUILDINGS.

1. Rural school, San Juan. 2. Polytechnic High, Los Angeles. 3. Lassen County High, Susanville. 4. City High, Stockton. 5. Grant Grammar, Oakland. 6. Luther Burbank Grammar, Santa Rosa.

1. School gardening. Washington School, Santa Barbara.

2. Sewing. Training School, San Diego State Normal School.

3. Wood work. Training School, San Diego State Normal School.

4. Cooking. Fresno Grammar School.

FIG. 626.—INDUSTRIAL WORK IN PUBLIC SCHOOLS.

They are five in number, located at Chico in the north, San Francisco and San José in the middle, Los Angeles and San Diego in the south.

Third, Special State Schools, as the California Polytechnic School (Fig. 627) at San Luis Obispo, free to boys and girls who

Fig. 627.
California Polytechnic School.

want to be farmers, stock growers, or tradesmen; the Institution for the Deaf and the Blind at Berkeley (Fig. 628); the School of Industry at Ione and the State Industrial School at Whittier, where children are sent by the courts to get a new chance to learn decent citizenship.

Fig. 628.
Institution for the Deaf and the Blind, Berkeley.

Fourth, Private Schools, doing work similar to our public schools, but supported by churches and the parents of children who attend them. There are about two hundred of these in the state, chiefly parochial schools. There are about forty orphan schools, partly supported by the state.

Fifth, Sectarian Colleges, supported by tuition charges and private benefactions, and controlled by various religious denomina-

FIG. 629. — UNIVERSITIES.

1. Greek Theatre, University of California. 2. Quadrangle and Memorial Church, Leland Stanford Jr. University. 3 Lick Observatory Mt Hamilton near San José.

tions. Santa Clara College is Catholic; Occidental at Los Angeles is Presbyterian; Pomona is Congregational; the University of Southern California at Los Angeles and the University of the Pacific near San José are Methodist. Mills College at Oakland is the only college exclusively for women in the state.

Sixth, Universities (Fig. 629). The University of California at Berkeley is supported by state taxes and private benefactions. Stanford University, at Palo Alto, is supported by private benefaction. Tuition in both of these universities is free, and both are coeducational; that is, they educate both men and women.

Government

California is one of the forty-eight states of the Union governed in much the same manner as the other states under the Federal Government, whose seat is at Washington, D.C.

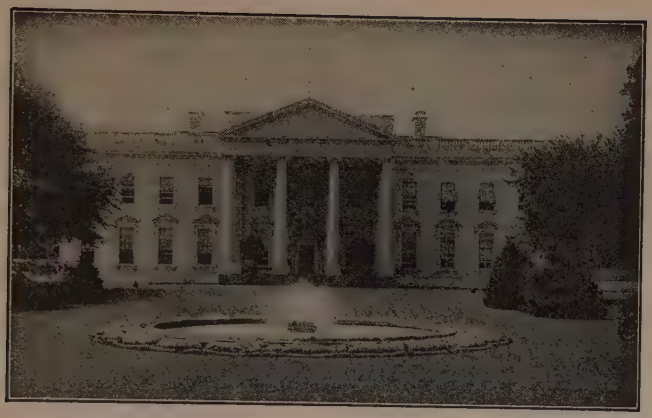
The laws of the Federal Government are made by Congress (Fig. 85), composed of the Senate and the House of Representatives.

The laws of the State Government are made by the Legislature (Fig. 630), composed of the Senate and Assembly. In California the Legislature meets biennially. The Judicial Department consists of the Supreme Court, the three Appellate Courts, County Superior Courts, Justice Courts, and Police Courts.

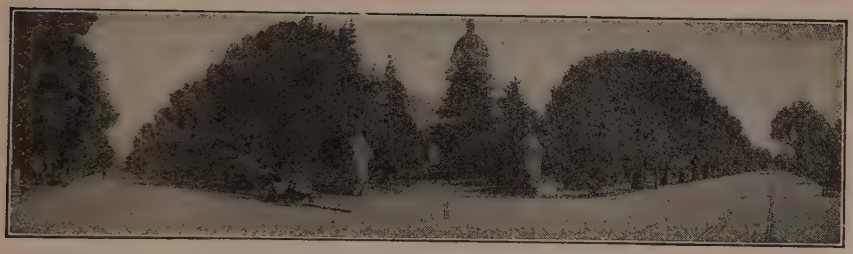
There are fifty-eight counties in the state, each of which has local laws enacted by its Board of Supervisors. Every incorporated city in the state has its own local laws enacted by its Governing Body. The Governor of the state is the chief Executive.

QUESTIONS

(1) Describe the public school system of California. For what purposes do the public schools exist? (2) Tell of the normals; how many; where located. (3) What are the special state schools? Name some. (4) Tell of the private schools. (5) Sectarian colleges. Give names of some of the most prominent ones. (6) What is a university? Name the two large ones in California. (7) Describe briefly the government of California. (8) How many states are in the Union?



1. The "White House," Washington, D.C. The home of the President of the United States.



2. The State Capitol and grounds, Sacramento.

3. County Court House, Riverside.

FIG. 630. GOVERNMENT BUILDINGS.

Cities

More than half the people of California live in the cities; so it is important that all of us should get a clear idea of cities and city life while we are learning geography.

Cities are built up by reason of the progress and development of manufactures and commerce. This brings the people directly and indirectly engaged in them together, at points best suited to their economical advancement. Thus, the conditions we have studied under Manufacturing and Transportation have built up a plexus of cities on San Francisco Bay, with San Francisco, the metropolis of the state, as its center. Round about and closely connected by railroads, trolley lines and ferries are: Oakland, third city of the state; Berkeley, seat of the state university; Alameda, San Rafael, Point Richmond and many other towns (see map opposite page 556).

In the southern part of the state, similar conditions have built up another great plexus of cities, with Los Angeles, second city of California, as its center. Around it and closely connected by railroads and trolley lines, are Pasadena, Long Beach, Santa Ana, Santa Monica, San Pedro and a swarm of smaller towns, as shown on the map opposite page 563.

The most northern of the larger cities is Eureka, and the most southern is San Diego. San Jose, Sacramento, Stockton and Fresno are the largest of the interior cities. There are about forty other important cities, most of them county seats of the various counties that make up the state.

Limited space makes it impossible to describe here, all these cities, but a list of those containing two thousand people, or more, may be seen on page 639, and a list of county seats is given on page 641. Remember, though, that these figures are from the last United States census, that of 1900, and that since that time, many of these cities have grown tremendously. The figures given are the latest authentic ones obtainable at the time of printing this book, but good estimates of the present population of any city may be secured at the nearest newspaper office.

Sacramento, the capital city, is on the Sacramento River, about ninety miles northeast of San Francisco. The Capitol itself (Fig. 513) stands near the center of the city. Its grounds (Fig. 630) contain ten city blocks, or about thirty-three acres of deep, alluvial soil, very favorable to the growth of trees. These grounds have been laid out as a public park, which has become famous for its trees, shrubs and

flowers, gathered from all parts of the world. Particularly worthy of notice are its splendid rows of cedars, pines, redwoods and magnolias. The building is dignified and beautiful, its classic lines gleaming snowy white among the green trees, and surmounted by a graceful dome rising to a height of 240 feet. Its brilliant crown of electric lights makes a landmark at night in the adjacent level country, for many miles around. Its cost was about three millions of dollars. It shelters the Legislature, the Appellate Court, the State Library and all the State Officers.

The California Blue Book, which can be found in any public library or high school library, gives a vast amount of detailed information concerning the state capitol, state officers and everything connected with the government of the state.

QUESTIONS

The best way to study cities is for teacher and pupils to select some one city as a type, then consider it in detail and at length, perhaps spending a long time upon it. When one city is thoroughly understood it will be easy to understand any other when the need to do so comes up.

When the type city is chosen, all should work together in collecting material to illustrate it. Pictures, newspaper clippings, photographs, letters, magazine articles, pamphlets, specimens, circulars and all that, will answer the purpose. This should be displayed and discussed in class; and the children should estimate or figure out roughly many interesting questions, such for instance as these:

What is the reason for its location? What is its present population? Allowing five persons to a family, how many families in the city? How much milk would they need per day? How many cows are needed to produce this milk? Where are they kept? How many loaves of bread per day would the people need? Where does it come from? Where does the water for the city come from? Where does the sewage go? What fuel is used and where does it come from? What is the source of the city's wealth? Allowing three children per family, how many children are there in the city? How many teachers would be needed?

Last of All

Thus we have a picture in our minds of California, to remain during the coming years; a great state, commanding the central portion of the Pacific Coast of North America; a state largest but one in the Union and most varied of all in its surface, its climates, its soils, its products; a state of loftiest mountains, of widest deserts, of grandest scenery; a state peculiarly fitted as a desirable place for mankind to dwell; a state rich in resources and with a boundless future before it; a state of opportunity for the young who are now reading this book: opportunity for power, usefulness, happiness, prosperity.

GENERAL QUESTIONS

(1) What is meant by the Great Basin? (2) What would happen in the Great Basin if the rainfall should be greatly increased? (3) Tell something about the islands. How were they formed? (4) What are the chief things which affect the climate of California? (5) On which side of the mountain ranges does it rain the most, and why? (6) Where is the climate most uniform? (7) What part of the state receives the least rain? Why? (8) Tell about the climates which you would pass through in going in the summer from the Great Valley to the summit of the Sierra Nevada. (9) How would the vegetation change? What trees of value for lumber would you see? (10) Are the animals that we meet to-day like those living a long time ago? (11) Why do people destroy animals? What means have been taken for their preservation? (12) What is the object of establishing national forests? (13) Why does California have such a variety of natural resources? Mention the important ones. (14) Was California entered first from the land or from the water? (15) What natural barriers exist between California and the other portions of America? Were these as easy to cross in the early days as now? Why? (16) When did California come under the control of the Americans? What were then the two leading towns? (17) Why did not Monterey become a large city after the American occupation? (18) How much of a town was San Francisco in 1846? (19) What led to the rapid increase of the population of California after its conquest from Mexico? (20) What led San Francisco to become the most important city of the state? (21) In what portions of the state is most of the gold obtained? (22) Describe any kind of mining that you have seen carried on. (23) Explain the difference between placer, hydraulic, and quartz mining. (24) How did the pioneer gold-seekers reach the state? What difficulties did they encounter? Mention the different trails by which they entered the state. (25) What portion of the state was occupied by the Spanish at the time of the gold discovery? Why? (26) In what way are people enabled to grow fruit and other products where little rain falls? (27) Tell what is meant by citrus fruits; by deciduous fruit; by viticulture. (28) If there were no high mountains, how would the water supply be affected? (29) What helps to hold the water upon the slopes where it falls? Why? (30) Describe the process of irrigation. (31) What advantage have irrigated crops over those dependent upon the rainfall? (32) What are the important fruits shipped out of the state? Where do they mostly go? (33) Why were supplies of all kinds so high priced following the discovery of gold? (34) Tell how mountains are being torn down. (35) What agency formed the most of the lakes in California? (36) Tell something about the origin of the cañons in the Sierra Nevada Mountains. (37) Watch the work of water upon a slope during a rain, and tell what it does. (38) What is the most important occupation in the Sierra Nevada Mountains? Mention others. Why do people go into the mountains in the summer? (39) Mention the national parks in California. Why were they established? (40) What were the causes which determined the locations of the chief cities of the Great Valley? (41) How is the water power in the mountains utilized? Why are not manufacturing establishments located in the mountains? (42) How does the climate of the Great Valley differ from that of the Coast? Why? What part of the valley is adapted to oranges? (43) How are raisins made? What kind of climate is needed? (44) Where are most of the vegetables of the Great Valley grown? Why? (45) Where are the conditions most advantageous for dairying? Why? (46) What mineral abundant in the Coast Ranges is found in few places elsewhere in the

United States? (47) Where are the great copper mines? Mention some of the uses of copper. (48) Describe the most important uses of redwood. Tell something about this tree. (49) In what manner are the logs taken to mill, and the lumber from the mills to market? (50) Why is stock raising the most important industry of the volcanic plateau? Where is the climate of California the coldest? The hottest? Why? (51) How are volcanoes formed? (52) If you have ever seen lava, describe its appearance. (53) By what mountains is Southern California shut off from the rest of the state? (54) How do the railroads cross these mountains? (55) Tell what you can about the contrast between Southern California and the Great Basin. (56) Mention some of the products and climatic conditions which have made Southern California so noted. (57) Tell what you can find out about petroleum. What products are obtained in refining it? (58) Describe the value of mountains, of waste slopes around the mountains, and of the river bottoms. (59) What is bituminous rock, and for what is it used? (60) Describe the best harbor upon the coast of Southern California. (61) What has made Los Angeles the largest city in Southern California? (62) Describe the condition of the streams in summer in Southern California. (63) What is the difference between an ordinary well and an artesian well? (64) Describe the kind of climate and location best for oranges; for apples; for alfalfa; for beans. (65) Why do you suppose there are so few lakes in the mountains of Southern California? (66) What is a cloudburst? What is its effect upon the mountains? Where are the lowest valleys in California? Tell about their climate? (67) What is the nature of the water of lakes without outlet? Why? (68) How are salt and soda obtained from the waters of the lakes or sinks in California? (69) In what portions of the desert are borax and salt found? (70) What is rock salt? (71) What other minerals are found in the desert? (72) Tell what you can about the vegetation of the desert. Mention some of the important plants found there.

LOU DILLON, 1:58¼.

A native of Santa Rosa. She holds the world's record.

SUMMARY OF VALUES.

(From Report of California Development Board, 1914.)

Summary of the farm, packing-house, and factory values of products of California's soil and connected industries for 1913, marketed by the producer and for the most part shipped out of the state. Consumption by the producers not included except in case of animals slaughtered by rural population.

Compiled from data gathered from growers, dealers, distributers and other authoritative sources.

Orchard products—		
Fresh deciduous fruits, not including apples	$11,000,000	
Apples	2,021,120	
Citrus fruits (Sept. 1, 1912-Aug. 1, 1913)	21,000,000	
Dried fruits and raisins	15,000,000	
Prunes	4,950,000	
Canned fruits and vegetables	17,500,000	
Olives and olive oil	2,500,000	
Nuts	3,825,000	
		$77,796,120
Vineyard products—		
Table grapes	$7,000,000	
Raisins	4,875,000	
Wine and brandy	15,000,000	
		26,875,000
Garden products, fresh		9,842,000
Dairy and poultry products—		
Dairy products	$34,950,552	
Poultry products	18,205,896	
Honey, wax, etc.	600,000	
		53,756,448
Farm products—		
Barley	$22,542,000	
Wheat	3,990,000	
Oats	3,980,000	
Corn, rye and rice	2,167,000	32,679,000
Farm products (continued)—		
Grain, grass hay and alfalfa	$48,600,000	
Hops	4,250,000	
Sugar beets (paid growers, $4,923,000)	13,324,000	
Broom corn, tobacco, etc.	230,000	
		66,404,000
Other field crops—		
Potatoes	$9,720,800	
Potatoes, sweet	1,200,000	
Beans	6,975,000	
Onions	2,750,000	
Seeds and sundry others	2,500,000	
Melons	2,600,000	
Cotton	1,690,000	
		27,435,800
Fish industry—		
Coast and interior (cod, tuna and sardines)	$3,678,534	
Salmon fisheries, etc.	7,000,000	
		10,678,534
Forest and lumber products (estimated)		40,000,000
Petroleum (estimated), 97,865,946 barrels		46,000,000

Mineral products, other (estimated)—		
Gold	$20,000,000	
Cement	8,000,000	
Copper	5,500,000	
Other minerals	20,500,000	
		54,000,000
Farm animals and products—		
Increase over 1912 (U. S. Farmers' Bull.)	$33,834,300	
Slaughtered for market in cities	20,000,000	
Slaughtered in rural districts and towns	18,150,000	
Other animal products	5,600,000	
		77,584,300
Sundry others, not included above—		
Nursery products	$3,250,000	
Florist products	900,000	
Fruit marketed in cities	9,500,000	
Vegetables marketed in cities	15,750,000	
Cider, vinegar, etc.	2,200,000	31,600,000
Total		$554,651,202
Manufactures (as reported by Census 1910)		529,761,000
Manufactures (increase 5 per cent, 1913)		26,488,050
Grand total		$1,110,900,252

CITIES AND TOWNS OF 2,000 OR MORE PEOPLE; CENSUS 1910.

	1900	1910		1900	1910
Alameda	16,464	23,383	Palo Alto	------	4,486
Alhambra	------	5,021	Pasadena	9,117	30,291
Anaheim	------	2,628	Petaluma	3,871	5,880
Auburn	2,050	2,376	Pomona	5,526	10,207
Bakersfield	4,836	12,727	Porterville	------	2,696
Benicia	2,751	2,860	Red Bluff	2,750	3,530
Berkeley	13,214	40,434	Redding	2,946	3,572
Black Diamond	------	2,372	Redlands	4,797	10,499
Chico	2,640	3,750	Redondo Beach	------	2,935
Coalinga	------	4,199	Redwood	------	2,442
Colton	------	3,980	Richmond	------	6,802
Corona	------	3,540	Riverside	7,937	15,212
Emeryville	------	2,613	Roseville	------	2,608
Eureka	7,327	11,845	Sacramento	29,282	44,696
Fort Bragg	------	2,408	Salinas	3,304	3,376
Fresno	12,470	24,892	San Bernardino	6,150	12,799
Gilroy	------	2,437	San Diego	17,700	39,578
Glendale	------	2,746	San Francisco	342,782	416,912
Grass Valley	4,719	4,520	San Jose	21,500	28,946
Hanford	2,929	4,829	San Leandro	2,253	3,471
Hayward	------	2,746	San Luis Obispo	3,021	5,157
Hollister	------	2,308	San Mateo	------	4,384
Healdsburg	------	2,011	San Rafael	3,879	5,934
Jackson	------	2,085	Santa Ana	4,933	8,429
Livermore	------	2,080	Santa Barbara	6,587	11,659

Lodi	------	2,697
Long Beach	2,252	17,809
Los Angeles	102,479	319,198
Los Gatos	------	2,232
Madera	------	2,404
Martinez	------	2,115
Marysville	3,497	5,430
Merced	------	3,102
Mill Valley	------	2,551
Modesto	2,024	4,034
Monrovia	------	3,576
Monterey	------	4,923
Napa	4,036	5,791
Nevada City	3,250	2,689
Oakland	66,960	150,174
Ocean Park	------	3,119
Ontario	------	4,270
Orange	------	2,920
Oroville	------	3,859
Oxnard	------	2,555
Pacific Grove	------	2,384
Santa Clara	3,650	4,348
Santa Cruz	5,659	11,146
Santa Maria	------	2,260
Santa Monica	3,057	7,847
Santa Paula	------	2,216
Santa Rosa	6,673	7,817
Sausalito	------	2,383
Sawtelle	------	2,143
Sonora	------	2,029
South Pasadena	------	4,649
Stockton	17,506	23,253
Tulare	2,216	2,758
Ukiah	------	2,136
Upland	------	2,384
Vallejo	7,965	11,340
Ventura	2,470	2,945
Visalia	3,085	4,550
Watsonville	3,528	4,446
Whittier	------	4,550
Woodland	2,886	3,187

POPULATION OF COUNTIES.

	1910	1913
Alameda	246,131	285,000
Alpine	309	309
Amador	9,086	10,000
Butte	27,301	30,000
Calaveras	9,171	10,000
Colusa	7,732	8,500
Contra Costa	31,674	42,500
Del Norte	2,417	2,417
El Dorado	7,492	7,500
Fresno	75,657	100,000
Glenn	7,172	9,000
Humboldt	33,857	37,000
Imperial	13,591	30,000
Inyo	6,974	6,974
Kern	37,715	55,000
Kings	16,230	18,500
Lake	5,526	5,526
Lassen	4,802	7,000
Los Angeles	504,131	800,000
Madera	8,368	15,000
Marin	25,114	26,000
Mariposa	3,956	4,000
Mendocino	23,929	25,000
Merced	15,148	20,000
Modoc	6,191	7,000
Mono	2,843	2,042
Monterey	24,146	24,146
Napa	19,800	21,000
Nevada	14,955	15,000
Orange	34,436	42,500
Placer	18,237	18,237
Plumas	5,259	6,000
Riverside	34,696	38,000
Sacramento	67,806	90,000
San Benitó	8,041	8,400
San Bernardino	56,706	75,000
San Diego	61,665	140,000
San Francisco	416,912	560,582
San Joaquin	50,731	50,731
San Luis Obispo	19,383	24,000
San Mateo	26,585	37,500
Santa Barbara	27,738	32,500
Santa Clara	83,539	97,039
Santa Cruz	26,140	29,000
Shasta	18,920	20,000
Sierra	4,098	4,098
Siskiyou	18,800	24,000
Solano	27,559	29,080
Sonoma	48,394	52,500
Stanislaus	22,522	35,000
Sutter	6,328	7,000
Tehama	11,401	12,775
Trinity	3,301	3,300
Tulare	35,440	37,500
Tuolumne	9,979	10,000
Ventura	18,347	20,000
Yolo	13,926	15,000
Yuba	10,042	11,500
California	2,377,549	3,155,656

County	Date of Organization	Area Sq. Mi.	Value of All Property 1910	Origin or Meaning of Name of County	County Seat
Alameda	1853	840	$243,043,586	Shady Walk	Oakland
Alpine	1864	575	539,905	The Alps	Markleeville
Amador	1854	568	6,081,630	Lover	Jackson
Butte	1850	1,764	25,469,997	Sutter Buttes	Oroville
Calaveras	1850	990	6,607,594	Skulls	San Andreas
Colusa	1850	1,080	14,685,281	Indian Tribe	Colusa
Contra Costa	1850	750	42,631,665	Opposite Coast	Martinez
Del Norte	1857	1,546	4,880,765	The North	Crescent City
El Dorado	1850	1,891	6,785,170	Land of Gold	Placerville
Fresno	1856	5,606	78,998,660	Ash Tree	Fresno
Glenn	1891	1,460	16,980,132	Dr. Hugh J. Glenn	Willows
Humboldt	1853	3,507	34,958,314	Baron Alexander von Humboldt	Eureka
Imperial	1907	4,140	17,802,655	From Imperial Valley	El Centro
Inyo	1866	10,224	6,268,862	Indian Tribe	Independence
Kern	1866	8,159	73,253,382	Lieutenant Kern	Bakersfield
Kings	1893	1,260	15,356,486	Kings River	Hanford
Lake	1861	1,332	4,824,106	Clear Lake	Lakeport
Lassen	1864	4,750	7,431,405	Peter Lassen	Susanville
Los Angeles	1850	3,880	726,110,668	The Angels	Los Angeles
Madera	1893	2,140	14,388,045	Timber	Madera
Marin	1850	516	21,003,985	Indian Chief	San Rafael
Mariposa	1850	1,580	3,567,315	Butterfly	Mariposa
Mendocino	1850	3,400	16,334,097	Mendoza — Viceroy of Mexico	Ukiah
Merced	1855	1,750	25,001,574	Mercy	Merced
Modoc	1874	4,097	6,691,970	Modoc Indians	Alturas
Mono	1861	2,796	1,437,518	Good Looking	Bridgeport
Monterey	1850	3,450	31,769,895	Mountain King	Salinas
Napa	1850	800	17,419,458	Fish	Napa City
Nevada	1851	958	8,100,054	Snowy	Nevada City
Orange	1889	780	44,526,688	Orange Groves	Santa Ana
Placer	1851	1,484	13,379,216	The Place of Gold	Auburn
Plumas	1854	2,361	8,960,958	Feathers	Quincy
Riverside	1893	7,008	31,532,687	City of Riverside	Riverside
Sacramento	1850	1,007	86,589,795	Sacrament	Sacramento
San Benito	1874	1,476	8,184,027	St. Benedict	Hollister
San Bernardino	1853	20,055	58,285,281	Bold as a Bear	San Bernardino
San Diego	1850	4,877	59,140,997	St. James	San Diego
San Francisco	1850	42	605,141,664	St. Francis Mission	San Francisco
San Joaquin	1850	1,370	64,715,657	St. Joachim	Stockton
San Luis Obispo	1850	3,500	$20,207,375	St. Louis the Bishop	San Luis Obispo
San Mateo	1856	470	30,739,041	St. Matthew	Redwood City
Santa Barbara	1850	2,450	32,722,992	St. Barbara	Santa Barbara
Santa Clara	1850	1,355	77,987,556	St. Clara	San Jose
Santa Cruz	1850	425	19,915,174	Holy Cross	Santa Cruz
Shasta	1850	4,050	15,642,300	Chaste	Redding
Sierra	1852	910	2,394,194	Mountain Chain	Downieville
Siskiyou	1852	6,078	21,583,145	Indian Tribe	Yreka
Solano	1850	911	24,941,957	East Wind	Fairfield
Sonoma	1850	1,540	40,110,583	Valley of the Moon	Santa Rosa

County	Date of Organization	Area Sq. Mi.	Value of All Property 1910	Origin or Meaning of Name of County	County Seat
Stanislaus	1854	1,486	$29,878,470	Chief Estanislao	Modesto
Sutter	1850	611	9,184,568	John A. Sutter	Yuba City
Tehama	1856	3,200	14,474,792	Indian Tribe	Red Bluff
Trinity	1850	3,276	3,052,887	Trinity Sunday	Weaverville
Tulare	1852	4,863	45,397,614	Valley of the Tules	Visalia
Tuolumne	1850	2,282	9,885,945	Stone House or Cave	Sonora
Ventura	1872	1,850	30,763,999	(Good) Luck	San Buenaventura
Yolo	1850	1,017	22,085,786	A Place Thick with Rushes	Woodland
Yuba	1850	625	9,493,367	Wild Grape	Marysville

POPULATION OF CALIFORNIA, 1850 TO 1900

Census Years	Population	Increase	
		Number	Per Cent
1900	1,485,053	276,923	22.9
1890	1,208,130	343,436	39.7
1880	864,694	304,447	54.3
1870	560,247	180,253	47.4
1860	379,994	287,397	310.3
1850	92,597	—	—

GEOGRAPHICAL NAMES

Geographical names in California are derived mainly from three sources: Spanish, Indian, and English. In the calendar of the early missionaries, each day was sacred to one of the saints, and so they named new places according to the name of the saint on whose day the places were reached or discovered.

The names of the male saints begin with San, of the female with Santa.

San Bruno	sän brōō′no	St. Bruno
San Buenaventura	sän bwā′-nä-vĕn-tōō′rä	St. Bonaventure
San Carlos	sän kar′loce	St. Charles
San Gabriel	sän gā-bre-ĕl′	St. Gabriel
San José	sän ho-sā′	St. Joseph
San Juan	sän hōō än′	St. John
San Leandro	sän lā-ăn′dro	St. Leander
San Lucas	sän lōō′kas	St. Luke
San Luis Rey	sän lōō′ees rā	St. Louis King
San Miguel	sän me-ghĕı	St. Michael
San Rafael	sän rä-fä′el	St. Raphael

Santa Ana	sän′tä ä′nä	St. Ann
Santa Catalina	sän′tä kä-tä-lee′nä	St. Catherine
Santa Inez	sän′tä e-nĕs′	St. Agnes
Santa Isabel	sän′tä e-sä-bēl′	St. Elizabeth
Santa Lucia	sän′tä lōō-sē′-ä	St. Lucy
Santa Margarita	sän′tä mar-gä-ree′tä	St. Margaret
Santa Maria	sän′tä mä-ree′ä	St. Mary
Santa Paula	sän′tä pŏw′lä	St. Paula
Santa Rosa	sän′tä rō′zä	St. Rose

Many places were named from some characteristic feature or incident : —

Agua Fria	ä′gwä free′ä	Cold Water
Alcatraz	äl′kä-träs	Pelican
Almaden	äl-ma-dĕn′	The Mine
Arroyo Seco	ar-ro′yo sā′ko	Dry Creek
Arroyo Grande	ar-ro′yo gran′dā	Large Creek
Benicia	be-nish′i-á	Venice
Buena Vista	bwā′nä vēs′ta	Good View
Caliente	kä-lē-ān′te	Hot
Carquinez	kar-kee′nez	Name of Indian Tribe
Carpinteria	kar-pen-tä-ree′ä	Carpenter Shop
Cazadero	caz-ä-dā′ro	Place for Pursuing Game
Cerritos	cer-ree′toce	Little Hills
Cienega	se-ā′nā-gä	Marsh
Colorado	kol-o-rah′do	Red
Coyote	ko-yo′tā	A Species of Wolf
El Toro	el tō′ro	The Bull
Escondido	ĕs-kon-dee′do	Hidden
Farralones	făr-rä-lon′es	Points of Rock in the Sea
Gabilan	gä-ve-län′	Sparrow Hawk
Guadalupe	gwä-dä-loo′pā	Wolf River
La Jolla	lä ho′yah	The Jewel
Lobos	lo′boce	Wolves
Los Gatos	loce gä′tos	The Cats
Los Olivos	loce ol-ē′voce	The Olive Trees
Manzanita	man-sa-nee′tah	Little Apple
Milpitas	mil-pee′tas	Meadow
Monte Diablo	mon′ta de-ä′blo	Devil Mountain
Pajaro	pä′hä-ro	Bird
Palo Alto	pä′lo äl′to	Tall Tree
Paraiso	pä-rä-ee′so	Paradise
Paso Robles	pä′so ro′blĕs	Oak Pass
Pescadero	pes-kä-dā′ro	Fishmonger
Pinole	pe-no′lā	A Fermented Drink
Plaza	plä′zä	Public Square
Presidio	prā-see′de-o	Garrison
Punta Arenas	pun′tä ä-rā′nas	Sandy Point
Puente	poo-ĕn′tā	Bridge
Salinas	sä-lee′näs	Salt Places
Sierra Nevada	sē-ĕr′ra nā-vä′dă	Snowy Range

Soledad	sol-ā-dad′	Solitude
Sonora	so-no′rah	Zither
Tejon	tā-hon′	Badger
Tres Pinos	trĕs pee′noce	Three Pines

The following are some of the names derived from the old Spanish families: —

Alvarado	al-vā-rah′do	Coronado	cor-o-nah′do
Alviso	al-ve′so	Martinez	mar-tee′nĕz
Arguello	ar-gwā′lo	Pacheco	pä-cha′ko
Bodega	bo-dā′gä	Suñol	sōōn-yōl′
Castroville	käs′tro-vĭl	Vacaville	vä′kä-vĭl
Chico	chee′ko	Vallejo	vāl-lā′ho

The following are some of the many Indian names. Most of them are names of tribes: —

Cuyama	kī-ä′mä	
Klamath	klä′ınath	Indians
Mohave	mo-hä′vā	Three Mountains
Mokelumne	mo-kĕl′oum-ne	
Petaluma	pĕt-alōō′mä	Little Mound
Sequoia	se-quoi′ah	Name of a Cherokee Chief
Soquel	so-kĕl′	
Suisun	soo-e′sōōn	
Tahoe	ta-hō′	Big Water
Tehachapi	te-hach′e-pä	Valley of the Oaks
Temescal	tem-es-kal′	A Sweatbox
Tomales	to-mä′lĕs	A Mexican Food
Yosemite	yo-sem′i-te	Grizzly Bear
Yreka	wi-re′ka	White, Indian Name of Mt. Shasta

The name Tamalpais is a compound of Indian and Spanish. Tamal was the name of a tribe of Indians, and pais is the Spanish for country; hence, the country of the Tamal Indians.

The Spanish names are chiefly confined to the Coast Ranges and the southern part of the state. The names in the Sierra Nevada and Klamath mountains and the Great Valley were mostly given after the Americans came.

Among the places named for Americans are: Stockton, Sutter, Kern, Lassen, Murphy, Angel, Carson, Downie, Weaver, Heald, Folsom, Gilroy, Hollister, Humboldt, Fremont, and others. These men were either early residents of the state, or explorers.

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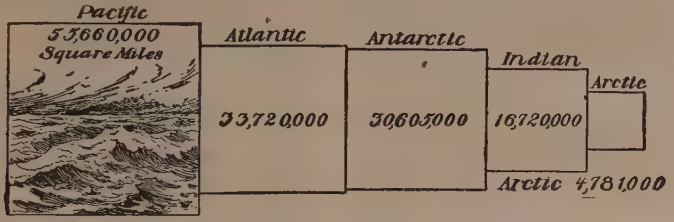
APPENDIX I

TABLES OF AREA, POPULATION, ETC.

NOTE. — The figures, 1910, etc., refer to the year in which the Census was taken or the estimate was made. Most of the recent figures are obtained from the United States Census Reports of 1910 or from "The Statesman's Year Book," 1913.

SIZE OF EARTH

Length of Earth's Diameter at the Equator (miles),	7,926	The Earth's Surface (square miles)	196,940,000
Length of Equator (miles),	24,902	Total Area of Ocean (square miles)	141,486,000



Relative areas of oceans. The Antarctic includes the great southern sea surrounding the south pole.

CONTINENTS AND PRINCIPAL COUNTRIES, COLONIES, ETC.

	Area in Square Miles	Population
North America	**8,500,000**	**125,000,000**
Alaska, 1910	590,884	64,356
Antigua, 1911	170	38,899
Bahama Islands, 1911	5,450	55,944
Bermuda Islands, 1911	20	18,994
British Honduras, 1911	8,598	40,458
Canada, 1911	3,603,910	7,192,338
Costa Rica, 1910	18,400	379,533
Cuba, 1910	44,000	2,150,112
Greenland, 1901	46,740	11,893
Guatemala, 1910	48,290	1,992,000
Haiti (Island), 1909	10,204	2,029,700
Honduras, 1910	46,250	553,446
Jamaica, 1910	4,200	862,422
Mexico, 1910	767,005	15,063,207
Newfoundland, 1910	42,734	237,531
Labrador, 1910	120,000	4,076
Nicaragua, 1910	49,200	600,000
Panama, 1909	31,500	419,029
St. Croix, 1901	84	18,401
St. Thomas, 1901	32	11,269
Salvador, 1910	7,225	1,070,555
United States, see p. iii		
South America	**7,400,000**	**49,000,000**
Argentina, 1910	1,135,840	7,091,822
Bolivia, 1910	708,195	2,267,935
Brazil, 1908	3,218,991	21,461,100
Chile, 1910	292,580	3,329,030
Colombia, 1908	438,436	4,303,000
Ecuador, 1910	116,000	1,500,000
Galapagos Islands, 1910		
Falkland Islands, 1911	5,500	2,272
Guiana, British, 1911	90,277	296,000
Guiana, Dutch, 1910	46,060	85,094
Guiana, French, 1911	30,500	49,009
Paraguay, 1910	171,204	752,000
Peru, 1910	695,733	4,000,000
South Georgia Islands	1,000	uninhabited
Tobago, 1911	114	330,074
Trinidad Island, 1911	1,754	
Uruguay, 1910	72,210	1,112,000
Venezuela, 1911	393,976	2,713,703
Europe	**3,796,000**	**392,246,000**
Albania, 1913	10,900	900,000
Andorra	175	5,231
Austria, 1910	115,903	28,567,898
Austria-Hungary, 1910	261,100	51,323,921
Balearic Isles, 1910	1,935	325,703
Belgium, 1910	11,373	7,516,780
British Empire, 1910	11,454,862	397,261,509
British Isles, 1910	121,390	45,469,564
Bulgaria, 1913	43,360	4,800,000
Corsica, 1906	3,367	291,160
Crete, 1900	3,365	310,185
Denmark, 1906	15,592	2,605,268
England, 1901	50,874	31,071,703
England and Wales, 1909	58,324	35,756,615

	Area in Square Miles	Population
Faroe Islands, 1901	540	16,349
France, 1906	207,054	39,252,245
German Empire, 1905	208,780	60,641,278
Great Britain, 1909	88,729	40,634,263
Greece, 1913	46,600	4,600,000
Hebrides Islands,	3,000	100,000
Hungary, 1900	125,430	19,254,559
Iceland, 1901	39,756	78,470
Ireland, 1909	32,360	4,374,158
Italy, 1909	110,659	34,269,746
Liechtenstein, 1906	65	9,650
Luxemburg, 1900	1,706	219,210
Malta, 1909	95	212,888
Monaco, 1909	8	19,121
Montenegro, 1913	5,600	500,000
Netherlands, 1908	12,648	5,825,198
Norway, 1908	124,130	2,352,786
Orkney Islands, 1901	376	28,699
Portugal, 1900	35,490	5,423,132
Prussia, 1905	134,616	37,293,324
Roumania, 1913	54,500	7,400,000
Russia, 1908	1,862,524	113,841,000
Russian Empire, 1908	8,647,657	155,433,300
San Marino, 1909	38	10,310
Sardinia, 1909	9,306	861,249
Scotland, 1909	30,405	4,877,648
Servia, 1913	33,600	4,300,000
Shetland Islands, 1901	551	28,166
Sicily, 1909	9,935	3,574,424
Spain, 1908	194,783	19,712,585
Sweden, 1908	172,876	5,429,600
Switzerland, 1908	15,976	3,559,349
Turkey, 1913	9,700	1,600,000
Turkish Empire, 1913	1,509,350	30,869,800
Wales, 1911	7,450	2,032,193
Asia with East Indies	**21,000,000**	**900,000,000**
Aden, 1911	75	46,165
Afghanistan, 1911	250,000	5,900,000
Arabia	1,200,000	4,825,000
Baluchistan, 1911	134,638	829,712
Bhutan, 1909	20,000	250,000
Bokhara, 1909	83,000	1,250,000
Burma, 1911	236,738	12,115,217
Ceylon, 1911	25,332	3,592,397
China (proper), 1906	1,532,420	407,253,030
Republic of China, 1910	4,277,170	438,425,000
Chinese Turkestan, 1906	550,340	1,200,000
Cyprus, 1910	3,584	261,587
Formosa, 1910	13,458	3,123,471
French India, 1909	196	277,000
French Indo-China, 1906	256,000	16,315,063
India, 1911	1,789,154	315,132,537
Japan, 1910	147,655	50,751,919
Khiva, 1909	24,000	800,000
Korea, 1911	86,000	13,125,027
Manchuria, 1909	363,610	16,000,000
Mongolia, 1906	1,367,600	2,600,000
Nepal, 1909	54,000	5,000,000
Oman, 1909	82,000	500,000
Palestine, 1905	10,000	700,000
Persia, 1909	628,000	9,500,000
Portuguese Indies, 1901	7,830	300,000
Russia in Asia, 1910	6,207,662	24,889,000
Siam, 1909	195,000	6,686,486
Siberia, 1910	4,786,730	8,220,100
Straits Settlements, 1911	1,472	714,069
Sungaria, 1901	147,950	600,000
Tibet, 1909	463,200	6,500,000
Turkey in Asia, 1909	693,610	17,683,500
Africa	**11,000,000**	**125,000,000**
Abyssinia, 1910	432,432	5,000,000
Algeria (Fr.), 1911	343,500	5,563,828
Anglo-Egyptian Sudan, 1909	950,000	2,363,000
Angola, 1909	484,800	4,119,000
Belgian Congo, 1909	909,650	20,000,000
British Somaliland, 1910	68,000	348,000
Canary Islands (Sp.), 1910	2,807	419,809
Cape of Good Hope, 1910	276,995	2,510,000
Cape Verde Islands (Port.), 1909	1,480	147,424
Egypt, 1907	400,000	11,189,978
Eritrea (Italy), 1906	45,800	450,000
French Congo, 1907	669,280	5,000,000
French Somaliland, 1907	5,790	180,000
Gambia (Br.), 1910	3,619	160,000
German East Africa, 1909	384,180	10,000,000
German Southwest Africa, 1909	322,450	120,000
Gold Coast and Protectorate, 1910	119,200	1,500,000
Italian Somaliland, 1909	139,430	400,000
Kamerun (Ger.), 1909	191,130	3,000,000
Liberia, 1909	40,000	1,500,000–2,100,000
Madagascar, 1911	228,000	3,054,658
Madeira Islands, 1900	314	150,574
Mauritius (Br.), 1910	835	379,184
Morocco, 1909	219,000	4,340,000–4,580,000
Natal, 1911	35,371	1,191,958
Nigeria, Northern, 1911	256,400	9,269,000
Nigeria, Southern, 1911	77,260	7,858,689
Orange Free State, 1910	50,392	478,815
Portuguese East Africa, 1901	293,400	3,120,000
Portuguese Guinea, 1901	13,940	820,000
Réunion Island (Fr.), 1907	910	201,000
St. Helena (Br.), 1911	47	3,520
Sierra Leone and Protectorate (Br.), 1910	30,000	1,100,000
Spanish Africa, 1910	85,814	235,844
Togo, 1910	33,700	1,000,000
Transvaal, 1910	110,426	1,400,000
Tripoli (Turk.), 1906	398,900	1,000,000
Tunis (Fr.), 1910	45,779	1,923,217
Uganda Protectorate, 1910	223,500	3,500,000
Zanzibar (Br.), 1910	1,020	200,000
Australia, Commonwealth of	**3,000,000**	**4,400,000**
New South Wales, 1910	310,372	1,621,677
Northern Territory, 1910	523,620	3,239
Queensland, 1910	670,500	572,654
South Australia, 1910	380,070	412,808
Tasmania, 1910	26,215	186,860
Victoria, 1911	87,884	1,315,000
Western Australia, 1911	975,920	283,986
East Indies and larger islands of the Pacific	**1,200,000**	**47,000,000**
Borneo, 1905	298,843	1,944,655
Celebes, 1905	71,470	851,905
Fiji Islands, 1910	7,740	133,831
Hawaiian Islands, 1910	6,449	191,909
Java and Madura, 1905	50,554	30,098,008

	Area in Square Miles	Population
Molucca Islands, 1905	43,864	407,906
New Caledonia, 1911	7,650	55,000
New Guinea		
British Guinea, 1910	151,789	200,000
Dutch Guinea, 1905	90,540	351,603
German Guinea, 1910	95,160	356,000
New Zealand, 1910	104,751	1,048,347
Philippine Islands, 1910	115,026	8,276,802
Samoa Islands, 1910	1,079	41,140
Solomon Islands (Br.), 1910	12,000	150,310
Solomon Islands (Ger.)	4,200	
Sumatra, 1905	161,612	4,029,503
Total Area of Continents		**56,000,000**
Total Population		**1,700,000,000**

STATES AND TERRITORIES OF THE UNITED STATES

	Area in Square Miles	Population 1900	Population 1910
Alabama	51,998	1,828,697	2,138,093
Alaska	590,884	63,592	64,356
Arizona	113,956	122,931	204,354
Arkansas	53,335	1,311,564	1,574,449
California	158,297	1,485,053	2,377,549
Colorado	103,948	539,700	799,024
Connecticut	4,965	908,420	1,114,756
Delaware	2,370	184,735	202,322
District of Columbia	70	278,718	331,069
Florida	58,666	528,542	752,619
Georgia	59,265	2,216,331	2,609,121
Guam	210	8,561	11,973
Hawaiian Islands	6,449	154,001	191,909
Idaho	84,313	161,772	325,594
Illinois	56,665	4,821,550	5,638,591
Indiana	36,354	2,516,462	2,700,876
Iowa	56,147	2,231,853	2,224,771
Kansas	82,158	1,470,495	1,690,949
Kentucky	40,598	2,147,174	2,289,905
Louisiana	48,506	1,381,625	1,656,388
Maine	33,040	694,466	742,371
Maryland	12,327	1,188,044	1,295,346
Massachusetts	8,266	2,805,346	3,366,416
Michigan	57,980	2,420,982	2,810,173
Minnesota	84,682	1,751,394	2,075,708
Mississippi	46,865	1,551,270	1,797,114
Missouri	69,420	3,106,665	3,293,335
Montana	146,572	243,329	376,053
Nebraska	77,520	1,066,300	1,192,214
Nevada	110,690	42,335	81,875
New Hampshire	9,341	411,588	430,572
New Jersey	8,224	1,883,669	2,537,167
New Mexico	122,634	195,310	327,301
New York	49,204	7,268,894	9,113,614
North Carolina	52,426	1,893,810	2,206,287
North Dakota	70,837	319,146	577,056
Ohio	41,040	4,157,545	4,767,121
Oklahoma	70,057	790,391	1,657,155
Oregon	96,699	413,536	672,765
Pennsylvania	45,126	6,302,115	7,665,111
Philippine Is.	127,853	7,360,551	8,276,802
Porto Rico	3,606	962,019	1,118,012
Rhode Island	1,248	428,556	542,610
South Carolina	30,989	1,340,316	1,515,400
South Dakota	77,615	401,570	583,888
Tennessee	42,022	2,020,616	2,184,789
Texas	265,896	3,048,710	3,896,542
Tutuila	77	3,800	6,780
Utah	84,990	276,749	373,351
Vermont	9,564	343,641	355,956
Virginia	42,627	1,854,184	2,061,612
Washington	69,127	518,103	1,141,990
West Virginia	24,170	958,800	1,221,119
Wisconsin	56,066	2,069,042	2,333,860
Wyoming	97,914	92,531	145,965
United States, total	**3,624,122**	**77,256,630**	**93,402,151**
United States (without Alaska, Philippine Islands, etc.)	**3,026,789**	**75,994,575**	**91,972,266**

TWENTY-FIVE OF THE LARGEST CITIES IN THE WORLD

	Population
1. London, England, 1910	4,872,702
Greater London, 1910	7,537,196
2. New York, U.S., 1910	4,766,883
3. Paris, France, 1911	2,846,986
4. Tokyo, Japan, 1909	2,168,069
5. Chicago, U.S., 1910	2,185,283
6. Berlin, Germany, 1910	2,070,695
7. Vienna, Austria-Hungary, 1911	2,004,291
8. Petrograd, Russia, 1910	1,907,708
9. Canton, China	1,600,000
10. Philadelphia, U.S., 1910	1,549,008
11. Moscow, Russia, 1907	1,359,254
12. Buenos Aires, Argentina, 1911	1,326,994
13. Calcutta, India, 1910	1,216,514
14. Constantinople, Turkey	1,125,000
15. Osaka, Japan, 1908	1,117,151
16. Shanghai, China	1,000,000
17. Tientsin, China, 1910	1,000,000
18. Rio de Janeiro, Brazil, 1909	1,000,000
19. Bombay, India, 1910	972,892
20. Hamburg, Germany, 1910	936 000
21. Liverpool, England, 1910	767,606
22. Glasgow, Scotland, 1909	872,021
23. Warsaw, Russia, 1901	756,426
24. Budapest, Austria-Hungary, 1901	732,322
25. Barcelona, Spain, 1911	700,000

TWENTY-FIVE LARGEST CITIES IN THE UNITED STATES

		Population 1900	Population 1910
1.	New York, N.Y.	3,437,202	4,766,883
2.	Chicago, Ill.	1,698,575	2,185,283
3.	Philadelphia, Pa.	1,293,697	1,549,008
4.	St. Louis, Mo.	575,238	687,029
5.	Boston, Mass.	560,892	670,585
6.	Cleveland, Ohio	381,768	560,663
7.	Baltimore, Md.	508,957	558,485
8.	Pittsburgh, Pa.	321,616	533,905
9.	Detroit, Mich.	285,704	465,766
10.	Buffalo, N.Y.	352,387	423,715
11.	San Francisco, Cal.	342,782	416,912
12.	Milwaukee, Wis.	285,315	373,857
13.	Cincinnati, Ohio	325,902	364,463
14.	Newark, N.J.	246,070	347,469
15.	New Orleans, La.	287,104	339,075
16.	Washington, D.C.	278,718	331,069
17.	Los Angeles, Cal.	102,479	319,198
18.	Minneapolis, Minn.	202,718	301,408
19.	Jersey City, N.J.	206,433	267,779
20.	Kansas City, Mo.	163,752	248,381
21.	Seattle, Wash.	80,671	237,194
22.	Indianapolis, Ind.	169,164	233,650
23.	Providence, R.I.	175,597	224,326
24.	Louisville, Ky.	204,731	223,928
25.	Rochester, N.Y.	162,608	218,146

GROWTH OF THE FIFTEEN LARGEST CITIES OF THE COUNTRY

	City	1800	1830	1890	1900	1910
1.	New York, N.Y.	60,489 (1)	197,112 (1)	2,507,414 (1)	3,437,202 (1)	4,766,883
2.	Chicago, Ill.	——	4,470 (1840)	1,099,850 (2)	1,698,575 (2)	2,185,283
3.	Philadelphia, Pa.	41,220 (2)	80,462 (3)	1,046,964 (3)	1,293,697 (3)	1,549,008
4.	St. Louis, Mo.	10,049 (1820)	14,125 (7)	451,770 (4)	575,238 (4)	687,029
5.	Boston, Mass.	24,937 (4)	61,392 (4)	448,477 (5)	560,892 (5)	670,585
6.	Cleveland, Ohio.	606 (1820)	1,076 (12)	261,353 (9)	381,768 (7)	560,663
7.	Baltimore, Md.	26,514 (3)	80,620 (2)	434,439 (6)	508,957 (6)	558,485
8.	Pittsburgh, Pa.	1,565 (5)	12,568 (8)	238,617 (12)	321,616 (11)	533,905
9.	Detroit, Mich.	1,422 (1820)	2,222 (11)	205,876 (13)	285,704 (13)	465,766
10.	Buffalo, N.Y.	2,095 (1820)	8,668 (10)	255,664 (10)	352,387 (8)	423,715
11.	San Francisco, Cal.	——	——	298,997 (7)	342,782 (9)	416,912
12.	Milwaukee, Wis.	——	1,172 (1840)	204,468 (14)	285,315 (14)	373,857
13.	Cincinnati, Ohio.	2,540 (1810)	24,831 (6)	296,908 (8)	325,902 (10)	364,463
14.	Newark, N.J.	8,008 (1810)	10,953 (9)	181,830 (15)	246,070 (15)	347,469
15.	New Orleans, La.	17,242 (1810)	29,737 (5)	242,039 (11)	287,104 (12)	339,075

CITIES OF THE UNITED STATES WITH 25,000 OR MORE INHABITANTS IN 1910; AND A FEW OTHERS, MOSTLY MENTIONED IN THE BOOK

	Population, 1900	Population, 1910
Akron, Ohio	42,728	69,067
Albany, N.Y.	94,151	100,253
Albuquerque, N.M.	6,238	11,020
Allentown, Pa.	35,416	51,913
Altoona, Pa.	38,973	52,127
Annapolis, Md.	8,575	8,609
Ann Arbor, Mich.	14,509	14,817
Asheville, N.C.	14,694	18,762
Ashland, Wis.	13,074	11,594
Astoria, Ore.	8,381	9,599
Atchison, Kan.	15,722	16,429
Atlanta, Ga.	89,872	154,839
Atlantic City, N.J.	27,838	46,150
Auburn, Me.	12,951	15,064
Auburn, N.Y.	30,345	34,668
Augusta, Ga.	39,441	41,040
Augusta, Me.	11,683	13,211
Austin, Tex.	22,258	29,860
Baltimore, Md.	508,957	558,485
Bangor, Me.	21,850	24,803
Bath, Me.	10,477	9,396
Baton Rouge, La.	11,269	14,897
Bay City, Mich.	40,747	45,166
Bayonne, N.J.	32,722	55,545
Berkeley, Cal.	13,214	40,434
Biddeford, Me.	16,145	17,079
Billings, Mont.	3,221	10,031
Binghamton, N.Y.	39,647	48,443
Birmingham, Ala.	88,415	132,685
Bismarck, N.D.	3,819	5,443
Boise, Idaho	5,957	17,358
Boston, Mass.	560,892	670,585
Bradford, Pa.	15,029	14,544
Bridgeport, Conn.	70,996	102,054
Brockton, Mass	40,063	56,878
Brunswick, Ga.	9,081	10,182
Buffalo, N.Y.	352,387	423,715
Burlington, Vt.	18,640	20,463
Butte, Mont.	30,470	39,165
Cambridge, Mass.	91,886	104,839
Camden, N.J.	75,935	94,538
Canton, Ohio	30,667	50,217
Carson City, Nev.	2,100	2,466
Cedar Rapids, Iowa.	25,656	32,811
Charleston, S.C.	55,807	58,833
Charleston, W. Va.	11,099	22,996
Charlotte, N.C.	18,091	34,014
Chattanooga, Tenn.	30,154	44,604
Chelsea, Mass.	34,072	32,452
Chester, Pa.	33,988	38,537
Cheyenne, Wyo.	14,087	11,320
Chicago, Ill.	1,698,575	2,185,283
Cincinnati, Ohio	325,902	364,463
Cleveland, Ohio	381,768	560,663
Colorado Springs, Colo.	21,085	29,078
Columbia, S.C.	21,108	26,319
Columbus, Ga.	17,614	20,554
Columbus, Ohio	125,560	181,548
Concord, N.H.	19,632	21,497
Council Bluffs, Iowa	25,802	29,292

	Population, 1900	Population, 1910
Covington, Ky.	42,988	53,270
Cripple Creek, Colo.	10,147	6,206
Dallas, Tex.	42,638	92,104
Danville, Va.	16,520	19,020
Davenport, Iowa	35,254	43,028
Dayton, Ohio	85,333	116,577
Denver, Colo.	133,859	213,381
Des Moines, Iowa	62,139	86,368
Detroit, Mich.	285,704	465,766
Dover, Del.	3,329	3,720
Dover, N.H.	13,207	13,247
Dubuque, Iowa	36,297	38,494
Duluth, Minn	52,969	78,466
Durham, N.C.	6,679	18,241
Easton, Pa.	25,238	28,523
East St. Louis, Ill.	29,655	58,547
Elizabeth, N.J.	52,130	73,409
Elmira, N.Y.	35,672	37,176
El Paso, Tex.	15,906	39,279
Erie, Pa.	52,733	66,525
Evansville, Ind.	59,007	69,647
Fall River, Mass.	104,863	119,295
Findlay, Ohio	17,613	14,858
Fitchburg, Mass.	31,531	37,826
Fort Wayne, Ind.	45,115	63,933
Fort Worth, Tex.	26,688	73,312
Frankfort, Ky.	9,487	10,465
Fresno, Cal.	12,470	24,892
Galveston, Tex.	37,789	36,981
Gloucester, Mass.	26,121	24,398
Grand Rapids, Mich.	87,565	112,571
Greeley, Colo.	3,023	8,179
Greenville, S.C.	11,860	15,741
Guthrie, Okla.	10,006	11,654
Harrisburg, Pa.	50,167	64,186
Hartford, Conn.	79,850	98,915
Haverhill, Mass.	37,175	44,115
Helena, Mont.	10,770	12,515
Hilo, Hawaiian Islands	19,785	6,745
Hoboken, N.J.	59,364	70,324
Holyoke, Mass.	45,712	57,730
Honolulu, Hawaiian Islands	39,306	52,183
Hot Springs, Ark.	9,973	14,434
Houston, Tex.	44,633	78,800
Indianapolis, Ind.	169,164	233,650
Ishpeming, Mich.	13,255	12,448
Ithaca, N.Y.	13,136	14,802
Jackson, Mich.	25,180	31,433
Jackson, Miss.	7,816	21,262
Jacksonville, Fla.	28,429	57,699
Jamestown, N.Y.	22,892	31,297
Jefferson City, Mo.	9,664	11,850
Jersey City, N.J.	206,433	267,779
Johnstown, Pa.	35,936	55,482
Joliet, Ill.	29,353	34,670
Joplin, Mo.	26,023	32,073
Juneau, Alaska	1,864	1,644
Kansas City, Kan.	51,418	82,331
Kansas City, Mo.	163,752	248,381
Key West, Fla.	17,114	19,945
Knoxville, Tenn.	32,637	36,346
La Crosse, Wis.	28,895	30,417
Lancaster, Pa.	41,459	47,227
Lansing, Mich.	16,485	31,229
Laramie, Wyo.	8,207	8,237
Lawrence, Mass.	62,559	85,892
Leadville, Colo	12,455	7,508
Lewiston, Me.	23,761	26,247
Lexington, Ky.	26,369	35,099
Lincoln, Neb.	40,169	43,973
Little Rock, Ark.	38,307	45,941
Lockport, N.Y.	16,581	17,970
Los Angeles, Cal.	127,927	319,198
Louisville, Ky.	204,731	223,928
Lowell, Mass.	94,969	106,294
Lynchburg, Va.	18,891	29,494
Lynn, Mass.	68,513	89,336
Macon, Ga.	23,272	40,665
Madison, Wis.	19,164	25,531
Malden, Mass.	33,664	44,404
Manchester, N.H.	56,987	70,063
Manila, Philippines, 1903	219,928	
Marquette, Mich.	10,058	11,503
McKeesport, Pa.	34,227	42,694
Memphis, Tenn.	102,320	131,105
Meriden, Conn.	24,296	27,265
Milwaukee, Wis.	285,315	373,857
Minneapolis, Minn.	202,718	301,408
Mobile, Ala.	38,469	51,521
Montgomery, Ala.	30,346	38,136
Montpelier, Vt.	6,266	7,856
Nashua, N.H.	23,898	26,005
Nashville, Tenn.	80,865	110,364
Natchez, Miss.	12,210	11,791
Newark, N.J.	246,070	347,469
New Bedford, Mass.	62,442	96,652
New Britain, Conn.	25,998	43,916
Newcastle, Pa.	28,339	36,280
New Haven, Conn.	108,027	133,605
New Orleans, La.	287,104	339,075
Newport, Ky.	28,301	30,309
Newport, R.I.	22,441	27,149
Newport News, Va.	19,635	20,205
Newton, Mass.	33,587	39,806
New York, N.Y.	3,437,202	4,766,883
Niagara Falls, N.Y.	19,457	30,445
Nome City, Alaska	12,486	2,600
Norfolk, Va.	46,624	67,452
Norristown, Pa.	22,265	27,875
Oakland, Cal.	66,960	150,174
Ogden, Utah	16,313	25,580
Oil City, Pa.	13,264	15,657
Oklahoma City, Okla.	10,037	64,205
Olean, N.Y.	9,462	14,743
Olympia, Wash.	4,082	6,996
Omaha, Neb.	102,555	124,096
Oshkosh, Wis.	28,284	33,062
Oswego, N.Y.	22,199	23,368
Pasadena, Cal.	9,117	30,291
Passaic, N.J.	27,777	54,773
Paterson, N.J.	105,171	125,600
Pawtucket, R.I.	39,231	51,622
Pensacola, Fla.	17,747	22,982
Peoria, Ill.	56,100	66,950
Philadelphia, Pa.	1,293,697	1,549,008
Phœnix, Ariz.	5,544	11,134
Pierre, S.D.	2,306	3,656
Pittsburgh, Pa.	321,616	533,905
Pittsfield, Mass.	21,766	32,121
Plymouth, Mass.	9,562	12,141
Pomona, Cal.	5,526	10,207
Ponce, Porto Rico, 1899	27,952	35,027
Portland, Me.	50,145	58,571
Portland, Ore.	90,426	207,214
Portsmouth, N.H.	10,637	11,269
Poughkeepsie, N.Y.	24,029	27,936
Providence, R.I.	175,597	224,326
Provincetown, Mass., 1895	4,555	4,369
Pueblo, Colo.	28,157	44,395
Quincy, Ill.	36,252	36,587

	Population, 1900	Population, 1910
Quincy, Mass.	23,899	32,642
Racine, Wis.	29,102	38,002
Raleigh, N.C.	13,643	19,218
Reading, Pa.	78,961	96,071
Redlands, Cal.	4,797	10,449
Richmond, Va.	85,050	127,628
Riverside, Cal.	7,973	15,212
Roanoke, Va.	21,495	34,874
Rochester, N.Y.	162,608	218,149
Rockford, Ill.	31,051	45,401
Rome, Ga.	7,291	12,099
Rutland, Vt.	11,499	13,546
Sacramento, Cal.	29,282	44,696
Saginaw, Mich.	42,345	50,510
St. Augustine, Fla.	4,272	5,494
St. Joseph, Mo.	102,979	77,403
St. Louis, Mo.	575,238	687,029
St. Paul, Minn.	163,065	214,744
Salem, Mass.	35,956	43,697
Salem, Ore.	4,258	14,094
Salt Lake City, Utah	53,531	92,777
San Antonio, Tex.	53,321	96,614
San Diego, Cal.	17,700	39,578
San Francisco, Cal.	342,782	416,912
San José, Cal.	21,500	28,946
San Juan, Porto Rico, 1899	32,048	48,716
Santa Fé, N.M.	5,603	5,072
Sault Ste. Marie, Mich.	10,538	12,615
Savannah, Ga.	54,244	65,064
Schenectady, N.Y.	31,682	72,826
Scranton, Pa.	102,026	129,867
Seattle, Wash.	80,671	237,194
Shreveport, La.	16,013	28,015
Sioux City, Iowa	33,111	47,828
Sioux Falls, S.D.	10,266	14,094
Sitka, Alaska	1,396	1,039
Somerville, Mass.	61,643	77,236

	Population, 1900	Population, 1910
South Bend, Ind.	35,999	53,684
South Omaha, Neb.	26,001	26,259
Spokane, Wash.	36,848	104,402
Springfield, Ill.	34,159	51,678
Springfield, Mass.	62,059	88,926
Springfield, Ohio	38,253	46,921
Stockton, Cal.	17,506	23,253
Superior, Wis.	31,091	40,384
Syracuse, N.Y.	108,374	137,249
Tacoma, Wash.	37,714	83,743
Tallahassee, Fla.	2,981	5,018
Tampa, Fla.	15,839	37,782
Taunton, Mass.	31,036	34,259
Terre Haute, Ind.	36,673	58,157
Toledo, Ohio	131,822	168,497
Topeka, Kan.	33,608	43,684
Trenton, N.J.	73,307	96,815
Troy, N.Y.	60,651	76,813
Tucson, Ariz.	7,521	13,193
Utica, N.Y.	56,383	74,419
Vicksburg, Miss.	14,834	20,814
Virginia City, Nev.	2,695	2,244
Waltham, Mass.	23,481	27,834
Washington, D.C.	278,718	331,069
Waterbury, Conn.	45,859	73,141
Watertown, N.Y.	21,696	26,730
Wheeling, W. Va.	38,878	41,641
Wichita, Kan.	24,671	52,450
Wilkes Barre, Pa.	51,721	67,105
Williamsport, Pa.	28,757	31,860
Wilmington, Del.	76,508	87,411
Winona, Minn.	19,714	18,583
Woonsocket, R.I.	28,204	38,125
Worcester, Mass.	118,421	145,986
Yonkers, N.Y.	47,931	79,803
York, Pa.	33,708	44,750
Youngstown, Ohio	44,885	79,066

FOREIGN CITIES MOST OF WHICH ARE MENTIONED IN THE TEXT

	Population
Aachen, Germany, 1910	156,044
Abeokuta, Niger Territory	150,000
Aberdeen, Scotland, 1911	163,084
Acapulco, Mexico	5,000
Adelaide, Australia, 1910	192,000
Adis Ababa, Abyssinia	30,000–35,000
Alexandria, Egypt, 1907	332,246
Algiers, Algeria, 1906	138,240
Amsterdam, Netherlands, 1910	573,933
Antwerp, Belgium, 1910	320,640
Archangel, Russia, 1911	35,000
Arequipa, Peru, 1908	35,000–40,000
Asuncion, Paraguay, 1910	84,000
Athens, Greece, 1907	167,479
Auckland, New Zealand, 1911	102,676
Bagdad, Turkey in Asia	75,000
Bahia, Brazil, 1909	230,000
Baku, Russia, 1904	177,777
Ballarat, Australia, 1910	44,000
Bangkok, Siam, 1909	628,675
Barcelona, Spain, 1911	700,000
Barmen, Germany, 1910	169,201
Basel, Switzerland, 1910	131,914
Batavia, Java, 1905	138,551
Belfast, Ireland, 1910	391,167

	Population
Belgrade, Servia, 1910	84,235
Benares, India, 1911	203,804
Bendigo, Australia, 1911	42,000
Berbera, Br. Somaliland	30,000
Bergen, Norway, 1910	76,917
Berlin, Germany, 1910	2,070,695
Berne, Switzerland, 1910	85,264
Bilbao, Spain, 1910	92,514
Birmingham, England, 1910	570,113
Bloemfontein, South Africa, 1911	14,760
Bogota, Colombia, 1910	290,000
Bologna, Italy, 1911	173,639
Bombay, India, 1910	972,892
Bordeaux, France, 1911	261,678
Bradford, England, 1910	295,865
Bremen, Germany, 1910	246,827
Breslau, Germany, 1910	511,891
Brindisi, Italy, 1907	22,021
Brisbane, Australia, 1909	143,077
Bristol, England, 1910	382,550
Brussels, Belgium, 1910	665,806
Bucharest, Roumania, 1908	300,000
Budapest, Austria-Hungary, 1910	880,371
Buenos Aires, Argentina, 1911	1,326,994
Cadiz, Spain, 1910	67,174

	Population
Cairo, Egypt, 1907	654,476
Calcutta, India, 1911	1,216,514
Calgary, Canada, 1911	44,000
Callao, Peru, 1908	31,000
Cambridge, England, 1905	38,760
Canton, China	1,600,000
Cape Town, Cape of Good Hope, 1911	67,000
Caracas, Venezuela,	72,429
Cardiff, Wales, 1910	199,189
Cartagena, Colombia, 1910	27,000
Cartagena, Spain, 1910	96,988
Catania, Italy, 1911	211,699
Cayenne, French Guiana, 1910	12,426
Cettinje, Montenegro, 1906	4,500
Chemnitz, Germany, 1910	287,807
Christchurch, New Zealand, 1911	80,198
Christiania, Norway, 1910	243,801
Cologne, Germany, 1910	516,167
Colon, Panama, 1910	19,300
Constantinople, Turkey	1,125,000
Copenhagen, Denmark, 1911	462,161
Cordoba, Argentina, 1911	70,380
Cordoba, Spain, 1910	65,160
Cork, Ireland, 1911	76,632
Cuzco, Peru, 1908	10,000–15,000
Damascus, Turkey in Asia	250,000
Danzig, Germany, 1910	170,347
Dawson, Canada, 1901	9,142
Delhi, India, 1911	232,837
Dover, England, 1905	43,734
Dresden, Germany, 1910	546,882
Dublin, Ireland, 1910	402,928
Dundee, Scotland, 1911	165,006
Dunedin, New Zealand, 1911	64,237
Durban, Natal, 1911	31,896
Edinburgh, Scotland, 1911	320,315
Elberfeld, Germany, 1910	170,118
Essen, Germany, 1910	294,629
Fez, Morocco, 1910	140,000
Fiume, Austria-Hungary, 1910	49,806
Florence, Italy, 1911	999,405
Frankfort, Germany, 1910	414,598
Fredericton, Canada, 1901	7,117
Freetown, Sierra Leone, 1910	37,682
Fuchau, China, 1909	624,000
Geneva, Switzerland, 1910	125,520
Genoa, Italy, 1911	272,077
Georgetown, British Guiana, 1908	53,176
Ghent, Belgium, 1910	164,659
Gibraltar, Spanish Pen., 1909	25,915
Glasgow, Scotland, 1910	784,455
Gothenburg, Sweden, 1910	167,813
Granada, Spain, 1910	74,283
Grimsby, England, 1910	74,283
Guatemala, Guatemala, 1910	90,000
Guayaquil, Ecuador, 1910	80,000
Hague, The, Netherlands, 1910	280,515
Halifax, Canada, 1911	46,000
Halle, Germany, 1910	180,551
Hamburg, Germany, 1910	936,000
Hamilton, Bermuda, 1907	2,246
Hamilton, Canada, 1911	82,000
Hammerfest, Norway	2,239
Hangchau, China, 1909	350,000
Hankau, China, 1909	820,000
Hanover, Germany, 1910	302,384
Havana, Cuba, 1910	319,884
Havre, France, 1911	136,159
Hebron, Holy Land	18,000–19,000
Helsingfors, Russia, 1908	137,346

	Population
Hobart, Tasmania, 1911	27,719
Hongkong, China, 1908	329,650
Hué, French Ind. China, 1910	50,000
Hull, England, 1909	275,552
Hyderabad, India, 1911	500,623
Iquique, Chile, 1907	40,171
Irkutsk, Siberia, 1908	108,060
Jaffa, Holy Land	45,000
Jerusalem, Holy Land, 1910	70,000
Johannesburg, Transvaal, 1910	158,580
Kabul, Afghanistan	60,000
Khartum, Egyptian Sudan, 1909	20,956
Khelat, Baluchistan	14,000
Kiev, Russia, 1909	468,712
Kimberley, Cape of Good Hope, 1911	13,656
Kingston, Canada	17,961
Kingston, Jamaica, 1911	57,379
Kioto, Japan, 1908	442,462
Königsberg, Germany, 1910	245,853
Krefeld, Germany, 1910	129,412
Kumassi, Ashanti, 1910	7,000
La Guaira, Venezuela	8,000
La Paz, Bolivia, 1909	78,856
La Plata, Argentina, 1911	100,608
Lassa, Tibet	15,000–20,000
Leeds, England, 1910	490,985
Leghorn, Italy, 1908	108,000
Leicester, England, 1910	248,374
Leipzig, Germany, 1910	587,635
Leith, Scotland, 1911	80,489
Libreville, French Congo	3,000
Liege, Belgium, 1910	174,768
Lille, France, 1911	217,807
Lima, Peru, 1908	140,884
Limoges, France, 1911	92,181
Lisbon, Portugal, 1900	356,009
Liverpool, England, 1910	767,606
Loanda, Port. W. Africa	14,000
Lodz, Russia, 1908	393,526
London, Canada, 1911	46,000
London, England, 1910	4,872,702
London, Greater, 1910	7,587,196
Lourenço Marquez, Port. E. Africa, 1908	9,849
Lucerne, Switzerland, 1910	39,152
Lucknow, India, 1911	259,798
Lyon, France, 1911	523,796
Madras, India, 1911	518,660
Madrid, Spain, 1910	571,539
Magdeburg, Germany, 1910	279,685
Malaga, Spain, 1910	133,045
Manaos, Brazil, 1909	50,000
Manchester, England, 1910	716,354
Mandalay, Burma, 1910	138,299
Marseille, France, 1911	550,619
Maskat, Oman, 1907	25,000
Mecca, Turkey	80,000
Melbourne, Australia, 1910	591,830
Messina, Italy, 1911	126,172
Metz, Germany, 1910	68,667
Mexico City, Mexico, 1910	470,659
Milan, Italy, 1911	599,200
Mocha, Turkey in Asia	5,000
Mombasa, Br. E. Africa, 1910	30,000
Monrovia, Liberia, 1908	8,000
Montevideo, Uruguay, 1909	291,465
Montreal, Canada, 1911	466,000
Morocco, Morocco	50,000
Moscow, Russia, 1909	1,481,200
Munich, Germany, 1910	595,053
Nogoya, Japan, 1908	378,231

	Population
Naples, Italy, 1911	723,208
Nassau, Bahama, 1910	12,534
Nazareth, Holy Land	11,000
Newcastle, England, 1911	266,671
Nice, France, 1911	142,940
Nizhni Novgorod, Russia, 1904	92,273
Nottingham, England, 1910	266,471
Nuremberg, Germany, 1910	332,651
Odessa, Russia, 1909	478,900
Oporto, Portugal, 1900	167,955
Osaka, Japan, 1908	1,226,590
Ottawa, Canada, 1911	86,000
Oxford, England, 1910	53,220
Palermo, Italy, 1911	314,656
Panama, Panama, 1909	40,801
Para, Brazil	65,000
Paramaribo, Dutch Guiana, 1909	34,795
Paris, France, 1911	2,846,986
Peking, China	1,600,000
Pernambuco, Brazil, 1906	150,000
Perth, West Australia, 1908	54,854
Peterborough, Canada, 1901	11,239
Petrograd, 1910	1,907,708
Pietermaritzburg, Natal, 1908	30,539
Piræus, Greece, 1907	73,579
Pisa, Italy, 1911	65,215
Port Arthur, Canada, 1901	3,214
Port Arthur, China	——
Port au Prince, Haiti, 1908	100,000
Port Said, Egypt, 1907	49,884
Portsmouth, England, 1910	217,989
Posen, Germany, 1910	156,696
Potsdam, Germany, 1910	62,224
Prague, Austria-Hungary, 1910	223,741
Pretoria, Transvaal, 1910	48,609
Puebla, Mexico, 1910	101,214
Quebec, Canada, 1910	78,000
Queenstown, Ireland	9,082
Quito, Ecuador, 1909	70,000
Rangoon, Burma, 1911	289,432
Rheims, France, 1911	115,178
Riga, Russia, 1908	318,400
Rio de Janeiro, Brazil, 1909	1,000,000
Rome, Italy, 1911	538,634
Rosario, Argentina, 1909	176,076
Rotterdam, Netherlands, 1909	417,780
Roubaix, France, 1906	121,017
Rouen, France, 1906	118,459
St. Etienne, France, 1906	146,788
St. John, Canada, 1911	42,000
St. John's, Newfoundland, 1911	31,501
Samarkand, Russian Turkestan, 1905	66,166
San Luis Potosi, Mexico, 1910	82,946
San Salvador, Salvador, 1906	59,540
Santiago, Chile, 1907	332,724
Santo Domingo, Santo Domingo, 1909	18,626
Santos, Brazil, 1909	35,000
São Paulo, Brazil, 1909	400,000
Seoul, Korea, 1911	278,958
Seville, Spain, 1910	155,366
Sèvres, France	6,902
Shanghai, China	1,000,000
Sheffield, England, 1910	478,763
Siangtan, China, 1908	1,000,000
Singanfu, China, 1908	1,000,000
Singapore, Straits Settlements, 1911	311,985
Smyrna, Turkey, 1910	350,000
Sofia, Bulgaria, 1910	102,769
Southampton, England, 1910	127,157
Stettin, Germany, 1910	236,145
Stockholm, Sweden, 1910	341,986
Strassburg, Germany, 1910	178,290
Stuttgart, Germany, 1910	285,589
Suchau, China, 1908	500,000
Sucre, Bolivia, 1909	23,416
Suez, Egypt, 1910	18,347
Swansea, Wales, 1910	98,817
Sydney, Australia, 1910	621,100
Tampico, Mexico	9,885
Tananarivo, Madagascar, 1909	94,810
Tangier, Morocco, 1901	35,003
Tashkend, Russian Turkestan, 1904	164,740
Teheran, Persia, 1905	280,009
Tiberias, Holy Land, 1905	5,000
Tientsin, China, 1910	1,000,000
Tiflis, Russia, 1904	196,935
Timbuktu, Sudan	20,000
Tokyo, Japan, 1908	2,186,079
Toronto, Canada, 1911	376,000
Trebizond, Turkey in Asia	51,000
Trieste, Austria-Hungary, 1910	229,475
Tripoli, Tripoli, 1909	30,000
Trondhjem, Norway, 1910	45,228
Tunis, Tunis, 1906	227,519
Turin, Italy, 1911	427,733
Upernivik, Greenland	700
Valencia, Spain, 1910	233,348
Valparaiso, Chile, 1907	162,447
Vancouver, Canada, 1911	100,000
Venice, Italy, 1911	160,727
Vera Cruz, Mexico, 1910	29,164
Versailles, France, 1911	60,458
Victoria, Canada, 1911	32,000
Vienna, Austria-Hungary, 1911	2,004,291
Vladivostok, Siberia, 1909	90,162
Warsaw, Russia, 1909	781,179
Wellington, New Zealand, 1911	70,729
West Ham, England, 1910	328,585
Windsor, Canada, 1901	12,153
Winnipeg, Canada, 1911	135,000
Wuchang, China	300,000
Yakoba, Niger Terr.	50,000
Yarmouth, Canada, 1901	6,420
Yokohama, Japan, 1908	394,303
Zanzibar (British), 1910	35,262
Zurich, Switzerland, 1910	189,088

ELEVATION OF SOME PLATEAUS AND MOUNTAIN PEAKS

	Feet
Abyssinian Plateau	5–7,000
Aconcagua, Andes, Argentina (*highest in South America*)	22,860
Apo, Mindanao, Philippines	10,312
Ararat, Turkey in Asia	17,325
Mt. Blanc, Alps, France (*highest in Alps*)	15,781
Bolivian Plateau	10–13,000
Brazilian Plateau	2–2,500
Chimborazo, Andes, Ecuador	20,498
Cotopaxi, Andes, Ecuador	19,613
Elbruz, Caucasus, Russia	18,200

	Feet
Etna, Sicily	10,885
Everest, Himalayas, Nepal (*highest known in the world*)	29,002
Fremont Peak, Rocky Mountains, Wyo.	13,790
Fujiyama, Japan	12,365
Hecla, Iceland	5,110
Kunchinjunga	28,156
Kenia, Africa	18,620
Kilimanjaro, Africa (*highest known in Africa*)	19,780
Kosciusko, Australia (*highest in Australia*)	7,336
Logan, Coast Ranges, Canada (*highest known in Canada*)	19,539
McKinley, Alaska (*highest known in North America*)	20,464
Mauna Kea, Hawaiian Islands	13,805
Mauna Loa, Hawaiian Islands	13,675
Mayon, Luzon Island, Philippines	8,900
Mexican Plateau	5–6,000

	Feet
Mitchell, Appalachian Mts., N.C. (*highest in Eastern U.S.*)	6,711
Mt. Marcy, New York	5,344
Mt. Tina, Haiti	10,300
Orizaba, Mexico (*highest in Mexico*)	18,314
Pico del Turquino, Cuba	8,600
Pike's Peak, Rocky Mts., Colorado	14,111
Popocatepetl, Mexico	17,798
Rainier, Cascade Mts., Washington	14,363
St. Elias, Alaska	18,025
San Francisco Mountain, Arizona	12,794
Shasta, Cascade Mts., California	14,380
Tibet Plateau	10–15,000
United States, Western Plateau	5–6,000
Vesuvius, Italy	4,200
Washington, White Mts., N.H. (*highest in Northeastern U.S.*)	6,279
Whitney, Sierra Nevada, California (*highest in Western U.S.*)	14,502
Yunque, Porto Rico	3,609

SOME OF THE LARGEST RIVERS OF THE WORLD

	Length in Miles	Basin Area Sq. Miles	Ocean
North America			
Arkansas	2,170	185,671	Atlantic
Colorado	2,000	225,049	Pacific
Columbia	1,400	216,537	Pacific
Mackenzie	2,000	590,000	Arctic
Missouri	3,000	527,155	Atlantic
Missouri-Mississippi	4,300	1,257,000	Atlantic
Nelson	1,732	432,000	Atlantic
Ohio	975	201,720	Atlantic
Rio Grande	1,800	240,000	Atlantic
St. Lawrence	2,200	530,000	Atlantic
Yukon	2,000	440,000	Pacific
South America			
Amazon	3,300	2,500,000	Atlantic
Orinoco	1,350	366,000	Atlantic
Plata	2,580	1,200,000	Atlantic
São Francisco	1,800	200,000	Atlantic
Europe			
Danube	1,770	300,000	Atlantic
Dneiper	1,200	242,000	Atlantic
Dwina	1,000	140,000	Arctic
Elbe	725	55,000	Atlantic
Po	400	27,000	Atlantic
Rhine	800	75,000	Atlantic
Rhone	500	38,000	Atlantic
Seine	482	30,300	Atlantic
Thames	228	6,100	Atlantic
Volga	2,400	563,300	Caspian
Asia			
Amur	2,800	520,000	Pacific
Brahmaputra	1,800	425,000	Indian
Ganges	1,500	440,000	Indian
Hoang-ho	2,700	570,000	Pacific
Indus	1,800	372,700	Indian
Irawadi	1,500	158,000	Indian
Lena	2,800	950,000	Arctic
Mekong	2,800	280,000	Pacific
Ob	3,200	1,000,000	Arctic
Yangtse-kiang	3,200	548,000	Pacific
Yenisei	3,000	1,500,000	Arctic
Africa			
Congo	2,900	1,200,000	Atlantic
Niger	2,600	563,300	Atlantic
Nile	3,400	1,273,000	Atlantic
Zambezi	1,500	600,000	Indian
Australia			
Darling	1,100	———	Indian
Murray	1,000	270,000	Indian

SOME OF THE LARGE LAKES OF THE WORLD

	Area in Square Miles	Elevation in Feet	Greatest Depth in Feet
Aral Sea	26,900	160	225
Baikal	12,500	1,312	4,550
Balkash	7,800	780	70
Caspian	169,000	— 85 [1]	2,400
Chad, variable with season	10,000 and often more	800–900	12
Dead Sea	370	— 1,310 [1]	1,330
Erie	9,990	573	210
Great Bear Lake	11,200	200	———
Great Salt Lake	2,360	4,218	30–50
Great Slave Lake	10,100	———	over 650
Huron	22,322	582	756
Ladoga	7,000	60	730
Manitoba	1,850	810	———
Michigan	21,729	582	870
Nicaragua	3,600	110	88
Nyassa	14,000	1,500	600 +
Ontario	7,104	247	738
Superior	30,329	602	1,008
Tanganyika	12,650	2,300	2,100
Titicaca	3,300	12,875	700
Victoria Nyanza	30,000	4,000	590 +
Winnipeg	9,400	710	70

[1] Below sea level.

DISTRIBUTION OF MANKIND

Mongolians	**540,000,000**
China	380,000,000
Japan and Korea	55,000,000
Indo-China	35,000,000
Malaysia	30,000,000
Other Mongolians	40,000,000
Caucasians	**770,000,000**
Europe	355,000,000
Asia	280,000,000
America	115,000,000
Africa	15,000,000
Australasia	5,000,000
Ethiopians	**173,000,000**
Africa and Madagascar	153,000,000
North and South America	20,000,000
American Indians	**22,170,000**
Mexico	8,765,000
Brazil	4,200,000
Colombia	3,150,000
Peru	2,700,000
Bolivia, Guatemala, and Venezuela	4,225,000
United States	250,000
Canada	100,000

RELIGIONS OF MANKIND

Buddhists and Brahmins	650,000,000
Christians	440,000,000
Jews	8,000,000
Mohammedans	180,000,000
Pagans and others	250,000,000

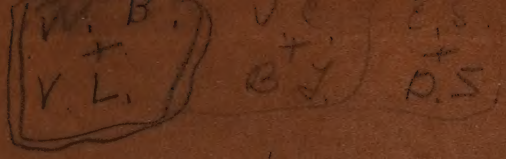
PRINCIPAL COUNTRIES FROM WHICH THE FOREIGN-BORN POPULATION OF THE UNITED STATES HAS COME

Country of Birth	Number in 1910
Austria-Hungary	258,737
Italy	215,537
Russian Empire	186,792
British North America	56,555
England	46,706
German Empire	31,283
Ireland	29,355
Greece	25,888
Sweden	23,745
Scotland	20,115

DISTRIBUTION OF NEGROES IN THE FIFTEEN STATES WHERE THEY ARE MOST NUMEROUS

States	Number of Negroes in 1900	Percentage of Negroes to Total Population, 1900
1. Georgia	1,034,813	46.69
2. Mississippi	907,630	58.50
3. Alabama	827,307	45.24
4. South Carolina	782,321	58.36
5. Virginia	660,722	35.63
6. Louisiana	650,804	47.10
7. North Carolina	624,469	32.97
8. Texas	620,722	20.36
9. Tennessee	480,243	23.77
10. Arkansas	366,856	27.97
11. Kentucky	284,706	13.25
12. Maryland	235,064	19.75
13. Florida	230,730	43.65
14. Missouri	161,234	5.18
15. Pennsylvania	156,845	2.48

Total number of Negroes in 1900, 8,840,789.


V. B.
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D. S.